THE

Gentleman's Diary,

OR THE

MATHEMATICAL REPOSITORY;

An ALMANACK

For the YEAR of our LORD 1754.

Being the Second after BISSEXTILE, or LEAP YEAR.

Containing many useful and entertaining Particulars, peculiarly adapted to the ingenious Gentlemen engaged in the delightful Study and Practice of the

MATHEMATICKS.

The Fourteenth *Almanack* publish'd of this Kind; And the Second of the NEW STYLE in *England*.

——Quâ causâ argentea Phœbe
Paribus haud æquis graditur; cur subdita nulli
Hactenus Astronomo numerorum fræna recusat:
Cur remeant Nodi, curque Auges progrediuntur.
——Quantis resluum vaga Cynthia pontum
Viribus impellit; dum fractis fluctibus ulvam
Deserit, ac Nautis suspectas nudat arenas,
Alternis vicibus suprema ad littora pulsans.

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ALL Perſons who are pleaſed to be CONTRIBUTORS to this DIARY; by anſwering the QUESTIONS, ENIGMAS, &c. or by ſending us new ones, or other Subjects proper for the WORK; are deſired to ſend them, and their Solutions, along with them, before the firſt Day of *May* 1754, directed to *The Authors of the* GENTLEMAN's DIARY, to be left with Mr. *JOSEPH HOW*, at the *White Horſe* at *Cripplegate*, LONDON: or, with Mr. *THOMAS PEAT*, in *Caſtlegate, Nottingham* (Poſt paid).

To the PUBLICK.

HAVING always more Room in the Kalendar Part of our Diary than we can poſſibly fill up with *good Weather*; we *expect* that an exact Account of all the FAIRS in *England*, as fixed ſince the Regulation of the *Style*, will ſupply that Room better than *bad Weather*; and alſo be of more general Service to *Tradeſmen, Dealers*, &c. according to the *Plan* in the KALENDAR this Year; and if this be agreeable, ſhall for the future publiſh them annually, according to the beſt Information we can procure from our Contributors in their reſpective Neighbourhoods, &c.

JANUARY hath xxxi Days.

	M	D	Suns Declin.
First Quarter the first Day at 7 at Night.		1	23 °S 0
Full Moon the 9 Day at 2 in the Morning		6	22 28
Last Quarter the 15 Day at 40 min. past 5 Afternoon		11	21 4
New Moon the 23 Day at 9 in the Morning.		16	20 5
First Quarter the 31 Day a quartert past 2 Afrernoon.		21	19 50
		26	18 26

1	Tu	Circumcision, New-Years-Day.	Morn.	5 A	49
2	W	Day 7 hours 53 minutes long.	0 30	6	33
3	Th	Day increas'd 10 minutes.	1 35	7	18
4	F	*We shall not be much more particular*	2 41	8	6
5	S	Old Christmas Day.	3 47	8	58
6	✠	Epiph CHRIST's ✱ app. to Gentiles	4 53	9	54
7	M	*than usual; but as some expect that*	5 55	10	53
8	Tu	Lucian, Priest and Martyr.	6 51	11	50
9	W	*this Year, in regard to the Weather,*	☽ Rises	Morn.	
10	Th	Princess ELIZABETH born.	6 A 29	0	49
11	F	*something shou'd be said about it;*	7 48	1	46
12	S	Old New-Years-Day.	9 7	2	41
13	✠	1 Sunday after Epiphany. Hillary B	10 25	3	35
14	M	*those may expect cold Frost and Snow;*	11 42	4	27
15	Tu	*or perhaps Rain with rough Winds;*	Morn.	5	19
16	W	*but possibly it may happen to be an*	0 57	6	10
17	Th	*open, mild and favourable Time the*	2 8	7	1
18	F	fair at Nott always Friday. 13 Jan	3 15	7	52
19	S	*Season of the Year consider'd.*	4 17	8	43
20	✠	2 Sunday after Epiphany. [Ret.	5 11	9	35
21	M	Agnes, Rom. V & M. Oct Hil 1.	5 57	10	25
22	Tu	Vinc. Span. Deac. M. *Melt Mowbray.*	6 37	11	14
23	W	Hillary Term begins.	☽ Sets	0 A	0
24	Th	Days are now increased 1 Hour.	5 A 58	0	46
25	F	Convers. of St. PAUL. Leighton Buz.	7 0	1	30
26	S	Day 8 hours 50 minutes long.	8 3	2	12
27	✠	3 Sunday after Epiphany.	9 6	2	54
28	M	Quind Hil. 2. Ret.	10 8	3	36
29	Tu	*January Weather still.*	11 10	4	19
30	W	K. CHARLES I. Mart.	Morn.	5	3
31	Th	Days increased 1 hour 24 Minute	0 12	5	49

D	☉ Rises	☉ Sets	☽ Rises	♃ Rises	♂ Sets	♀ Rises	☿ Rises	W. fast.
1	8 4	3 56	7 M 56	7 A 0	3 M 57	6 M 32	6 M 40	4 22
6	8 0	4 0	7 38	6 3	3 40	6 41	6 14	6 38
11	7 55	4 5	7 19	6 9	3 24	6 48	6 8	8 43
16	7 50	4 10	6 59	5 45	3 11	6 53	6 15	10 30
21	7 43	4 17	6 40	5 20	2 58	6 57	6 24	12 2
26	7 36	4 24	6 20	4 56	2 46	6 59	6 29	13 15

FEBRUARY hath xxviii Days.

M D	Sun's Declin.
1	17 S 0
6	15 30
11	13 52
16	12 10
21	10 24
26	8 32

Full Moon the 7 Day three Quarters past Noon.
Last Quarter the 14th 11 min. past 5 in the Morn
New Moon 22 Day 3 quarters past 3 in the Morn

M D	W D	Sundays, Holidays, remarkable Days Length, Incr. Days, Terms, Fairs, &c.	☽ Rise and Sets	Moon South
1	F	Day. 9 hours 9 minutes long.	1 M 15	6 A 38
2	S	Purif. V. MARY. Candlemas Day.	2 22	7 31
3	✠	4 Sunday after Epiphany.	3 27	8 27
4	M	Craft. Purif 3. Return. (*Derby*, the 5	4 25	9 25
5	Tu	Agatha Sicil V. and M. Old St. Paul	5 18	10 24
6	W	Days increas'd 1 hour 43 min.	6 3	11 22
7	Th	*Very likely to be (very) winter Weather:*	☽ Rises	Morn.
8	F	*but possibly not very disagreable to those*	6 A 34	0 20
9	S	*who have plenty of Food and Fuel; and*	7 57	1 15
10	✠	Septuagesima Sunday.	9 19	2 12
11	M	Octab. Purif. 4 Returns.	10 36	3 7
12	Tu	Hillary Term ends.	11 50	4 1
13	W	Old Candlemas Day.	Morn.	4 53
14	Th	Valentine Bish. and M.	1 3	5 45
15	F	*have nothing else to do but to keep their*	2 6	6 36
16	S	*own or their Neighbours Fire sides warm*	3 3	7 28
17	✠	Sexagesima Sunday.	3 55	8 18
18	M	*Nun Eaton.*	4 37	9 7
19	Tu	*We may expect that Winter is now, or*	5 13	9 54
20	W	*soon will be withdrawing it self (from us)*	5 42	10 40
21	Th	Day 10 hours. 22 min. long.	6 12	11 26
22	F	Days increas'd 2 hours 54 min.	☽ Sets	0 A 10
23	S	*but still a good Companion, and a (Fast*	6 A 55	0 51
24	✠	Quing. Shrove S. St. MATTHIAS Ap.	8 0	1 33
25	M	*good Fire may be very agreeable.*	9 4	2 15
26	Tu	Shrove Tuesday.	10 6	3 0
27	W	Ash Wednesday. 1st Day of Lent.	11 8	3 46
28	Th	Day 10 hours 40 min long	Morn.	4 34

M	D	☉ Rises	☉ Sets	☽ Rises	☿ Rises	♂ Sets	♀ Rises	♃ Rises	W. fast.
1		7 26	4 35	5 M 58	4 A 27	2 M 34	☽ M 50	6 M 38	14 14
6		7 18	4 44	5 40	Sets.	2 26	5 57	6 43	14 41
11		7 7	4 53	5 22	6 M 56	2 18	5 54	6 47	14 46
16		7 0	5 1	5 4	6 36	2 10	5 49	5 48	14 38
21		6 50	5 11	4 46	6 15	2 4	5 44	6 48	14 9
26		6 40	5 21	4 29	5 55	1 58	5 38	6 43	13 39

MARCH hath xxxi Days.

M D	Sun's Declin.
First Quarter the 2d Day 48 min past 5 in the Morning.	1 7 S 24
Full Moon the 8th 3 quarters after 10 at Night.	6 5 30
Last Quarter the 15th 49 min past 6 Afternoon.	11 3 32
New Moon the 23d 11 min past 10 at Night.	16 1 30
First Quarter the 31st 20 min past 5 in the Morning.	21 0 N 20
	26 2 23

			☽		☉ Rises	☉ Sets
1	F	David Archb. Minev.	0	M 11	5 A	24
2	S	Cedde or Chad B. Litch.	1	15	6	17
3	✠	1 Sunday in Lent. Quadragesima.	2	11	7	12
4	M	*Pontefract* 1st Mond. in March *fix'd.*	3	6	8	8
5	Tu	Day 11 hours long.	3	54	9	5
6	W	Ember W. *Chipping Norton* Oxf 7th.	4	37	10	3
7	Th	Old St. MAT. Fair at Notting.	5	11	11	2
8	F	Days encreas'd 3 hours 3 quarters.	☽	Rises	11	59
9	S	*Not very unpleasant, except troublesome*	6	A 54	Morn.	
10	✠	2 Sunday in Lent. Reminiscere.	8	15	0	55
11	M	Day 11 hours and half long.	9	36	1	51
12	Tu	Ereg. M. B of R. & C.	10	52	2	46
13	W	March Winds *with Snow or Rain*	Morn.		3	41
14	Th	*should make it disagreeable.*	0	1	4	35
15	F	*Oswestry*, Salop. *Derby*, Frid. Ash. W.	1	2	5	28
16	S	Days increas'd 4 hours and half	1	58	6	20
17	✠	3 Sunday in Lent.	2	44	7	10
18	M	Ed. K. of West. Sax.	3	21	8	0
19	Tu	☉ rises and sets due East and West.	3	53	8	45
20	W	☉ ♈ 4 h 43′. 48″. P.M. Equal Day	4	23	9	30
21	Th	Benedict. Abbot. [and Night.	4	48	10	15
22	F	March *Winds may still be expected and*	5	11	10	57
23	S	*possibly rough and cold.* ☉ Ecl. in *Fast.*	☽	Sets	11	40
24	✠	4 Sunday in Lent, or Midlent Sund.	7	A 0	0 A	23
25	M	Annunc. Lady Day Pr. EDWARD b.	8	4	1	7
26	Tu	Day 12 hours and half long.	9	8	1	52
27	W	☉ due E. 6 ho. 7 min. Alt. 2°. 58′	10	11	2	40
28	Th	*March Weather still, and to*	11	13	3	28
29	F	*the End*	Morn.		4	20
30	S	☉ Amplitude North 7 degrees	0	13	5	13
31	✠	5 Sunday in Lent.	1	0	6	7

M D	☉ Rises	☉ Sets	☽ Rises	♃ Sets	♂ Sets	♀ Rises	♀ Sets	W. Tai
1	5 34	5 27	4 M 19	5 M 43	1 M 54	6 M 34	5 A 9	12 42
6	6 24	5 37	4 2	5 23	1 50	6 28	5 44	11 3
11	6 14	5 47	3 45	5 4	1 45	6 20	6 22	10 1
16	6 4	5 57	3 28	4 44	1 39	6 11	7 4	8 5
21	5 59	6 7	3 11	4 25	1 34	6 3	7 41	7 2
26	5 44	6 17	2 54	4 7	1 29	5 55	8 6	5 4

APRIL hath xxx Days.

M D	Sun's Declin.
1	4 N 45
6	6 38
11	8 29
16	10 17
21	12 0
26	13 39

Full Moon 7th Day 10 min. past 8 in the Morn.
Last Quarter 14th 18 min. past 10 in the Morn.
New Moon 22d 51 min. past 2 Afternoon.
First Quarter 30th a quart. past 1 in the Morn.

1	M	All Fools Day.	2 M 1	7 A 2
2	Tu	Days increas'd 5 hours and half.	2 42	7 58
3	W	Richard Bish. of Chich.	3 13	8 54
4	Th	St. Ambrose, Bish. of Mil.	3 47	9 50
5	F	Old Lady Day.	4 25	10 4
6	S	☽ Ecl. 7th total, but invisible.	4 58	11 4
7	✠	6 Sunday in Lent. Palm Sunday.	☽ Rises	Morn.
8	M	*April Showers* (perhaps) *attended*	8 A 32	0 3
9	Tu	*with Thunder, but possibly otherwise,*	9 47	1 3
10	W	viz. *old fashioned March Winds*	10 55	2 30
11	Th	Fair at Notting. *Mansfield*, and	11 55	3 25
12	F	GOOD FRI. [*Kirkby-Lonsdale*, Westm.	Morn.	4 10
13	S	Days increas'd; 6 hours 20 min.	0 45	5 12
14	✠	EASTER DAY. Our SAV. Ref.	1 27	6 2
15	M	Easter Mond. *Shefford*, in Bedfords.	2 3	6 50
16	Tu	Easter Tuesday.	2 34	7 36
17	W	Day 13 hours 56 min. long.	3 2	8 20
18	Th	☉ due E. 6 ho. 37′. Alt. 14°. 50′.	3 25	9 3
19	F	*Derby.*	3 47	9 43
20	S	Days increas'd 6 hours 56 min.	4 10	10 28
21	✠	1 Sund. after Easter. Low Sunday.	4 33	11 12
22	M	*Bedford. Newport-Pagnel*, Bucks. ☉	☽ Sets	11 56
23	Tu	St. GEORGE. [Ecl. invis.	8 A 11	0 A 42
24	W	*Hope for fine Weather to the End.*	9 14	1 31
25	Th	St. MARK the Evangelist.	10 15	2 23
26	F	Prince WILLIAM born.	11 13	3 16
27	S	*Boroughbridge*, Yorksh.	Morn.	4 10
28	✠	2 Sunday after Easter.	0 1	5 4
29	M	Quin. Pasc. 1 Ret. *Market-Harbor.*	0 44	5 58
30	Tu	☉ rises Amplitude 25° 48′	1 21	6 52

M D	☉ Rises	☉ Sets	♄ Rises	♅ Sets	♂ Sets	♀	♃ Sets	W. fast
1	5 33	6 28	2 M 33	3 M 45	1 M 23	Not	8 A 19	3 55
6	5 23	6 38	2 1	3 27	1 17	to be	8 10	2 24
11	5 31	6 48	1 57	3 8	1 10	seen.	7 45	0 58
16	5 —	6 57	1 47	2 51	1 4		7 3	Slow
21	4 54	7 7	1 2	2 33	0 57		Rises	1 28
26	4 — 44	7 16	1 —	2 15	0 49		4 M 22	2 25

MAY hath xxxi Days.

	M	Son's Declin.
	☽	
Full Moon 6th Day 24 min. past 5 Afternoon.	1	1 N 13
Last Quarter 14 Day 10 m. past 3 in the Morn.	6	16 40
New Moon 22d Day half past 4 in the Morn.	11	18 0
First Quarter 29 Day 4 min. past 6 in the Morn.	16	19 12
	21	20 17
	26	1 15

1	W	St. Ph. & Jac. Ap. & M. East. Ter. beg	1 M	54	7 A 46
2	Th	*West Haddon*, North. (1ſt *Stockport*	2	25	8 30
3	F	Inv. of Cr. *Derby* (*Overton* Hants	2	54	9 33
4	S	*Boſton*, Linc. *Ampthill*, Bedfordſh.	3	25	10 27
5	✠	3 Sunday after Eaſter. Jubilate.	3	51	11 23
6	M	Treſ. Paſch 2 Reru. *Pleaſley*, Nott.	☽	Riſes	Morn.
7	Tu	*Chipping-Norton*, Oxfordſh. the 6th	8 A	39	0 19
8	W	*Market Boſworth*.	9	46	1 15
9	Th	*Higham-Ferrers*.	10	41	2 11
10	F	Day 15 hours 20 min. long.	11	28	3 6
11	S	*Tuxford*. Nottinghamſh. the 13th.	Morn.		3 58
12	✠	4 Sunday aft. Eaſter. Old May day	0	6	4 46
13	M	Menſ. Paſch 3 Ret. *Warwick Leiceſter*	0	35	5 33
14	Tu	*Elſtow*, Bedf. *Nun-Eaton*, *Denbeigh*.	1	0	6 19
15	W	(*Newark*, 14)	1	25	7 2
16	Th	Days increas'd 8 hours 1 quarter.	1	51	7 45
17	F	*We have not room to ſay much of Wea-*	2	16	8 28
18	S	☉ due E. 2 m. before 7 Alt. 25°. 25'	2	40	9 11
19	✠	5 Sunday after Rogat. Sunday.	3	5	9 55
20	M	Quind. Paſch 4 Ret. *Reach*, Cambr	3	13	10 40
21	Tu	Day 15 hours 50 min. long.	4	0	11 37
22	W	Rogation Week. *Mansfield* Holy Th.	☽	Sets	0 A 19
23	Th	Holy Thurſd. CHRIST's Aſcenſ.	9 A	25	1 15
24	F	*Kirkby Lonſdale*, Weſtm. on Ho. Th	10	0	2 6
25	S	Day 16 ho. Night 8 hours long.	10	43	3 1
26	✠	6 Sunday after Eaſter. Exaudi.	11	26	3 53
27	M	Term ends. *Donnington*.	11	57	4 48
28	Tu	*ther this Month, but expect as uſual.*	Morn.		5 41
29	W	K. CHAR. II. Nat. and Return.	0	28	6 34
30	Th	*Baldock*, Hertfordſh.	0	57	7 26
31	F	*Kettering*, Nort *Chipping Nort* Oxf.	1	23	8 19

M	D	☉ Riſes	☉ Sets	☽ Riſes	☽ Sets	♄ Sets	♀ Sets	♀ Riſ.	W. Row
1	4	36	7 2	6 M 45	1 M 57	6 M 42	8 A 6	4 M 7	5 10
6	4	28	7 33	0 26	1 59	0 33	8 22	3 58	3 42
11	4	20	7 41	0 6	1 21	0 23	8 37	3 47	4 [illegible]
16	4	12	7 49	11 A 41	1 4	0 12	8 52	3 37	4 [illegible]
21	4	5	7 55	11 21	0 4	0 [illegible]	9 [illegible]	3 26	3 5[illegible]
26	3	[illegible]	8 1	11 [illegible]	0 26	11 A [illegible]	9 [illegible]	3 [illegible]	3 [illegible]

JUNE hath xxx Days.

M D	Sun's Declin.
1	22 N
6	22 43
11	23 10
16	23 24
21	23 29
26	23 24

Full Moon 5 Day 50 min. past 2 in the Morning
Last Quarter 12 Day 38 min. past 8 Aftern.
New Moon 20 Day 20 min. past 3 Aftern.
First Quarter 27 Day 7 min. past 11 Morn.

1	S	Nicom. Rom. Pr. & M.	1 M	50	9 A	10
2	☩	Whitsund. Def. of the Holy Ghost.	2	22	10	5
3	M	Monday. *Southwel.* [*ton-Buzzard*	2	57	11	0
4	Tu	Tuef. Pr. of Wales b. *Newark, Leigh-*	3	36	11	55
5	W	Bonif. B. of Mentz. M. *Lenton.* Em W	☽	Rifes	Morn.	
6	Th	*Daventry* [*Maidenhead* Berk. Wh Wed	9 A	16	0	50
7	F	*Fine pleafant fummer* [*Bingham, Derby*	10	0	1	45
8	S	*Weather will be very acceptable now.*	10	36	2	35
9	☩	Trin Sund. Prs. AME. & CAROL. b.	11	7	3	23
10	M	Craf. Trin. 1 Return.	11	33	4	10
11	Tu	St. BARNAB. A. & M. *Sheffield*, York.	11	56	4	53
12	W	Day 16 hours and a half long	Morn.		5	36
13	Th	And Nights 7 ho. and almoft half.	0	18	6	18
14	F	Term begins.	0	39	7	0
15	S	*Good Weather for the Lawyers, &c.*	1	0	7	44
16	☩	1 Sunday after Trinity.	1	25	8	28
17	M	Oct Trin. 2 Ret. *St. Alb. Belton*, Lei.	1	55	9	15
18	Tu	*and we hope, not bad for Farmers,*	2	29	10	4
19	W	*Graziers, Travellers, &c. &c. &c.*	3	8	10	56
20	Th	*Abingdon*, Berks.	☽	Sets	11	56
21	F	☉ ♋ 3h. 9′ 54″ After. Longeft Day	8 A	37	0 A	47
22	S	K. GEO. II. Inau. *Boroughbrid.* York	9	24	1	43
23	☩	2 Sunday after Trin. *Cambridge* 24	9	55	2	38
24	M	Nat. of St. JOHN Bap. 2 Trin. 3 Ret.	10	28	3	32
25	Tu	*Alconbury*, Hunt. on New Midf. Day	11	0	4	26
26	W	K. GEO. II. pro. 1727. *Perfhore*, Wo	11	25	5	18
27	Th	*Brackley*, Northam. 26. All their Fair	11	53	6	9
28	F	*Derby.* [are kept O. S	Morn.		7	1
29	S	St. PET. Ap. & Mart. *Mansfield*, Nott.	0	21	7	52
30	☩	3 Sunday after Trinity.	0	53	8	45

M	D	☉ Rifes	☉ Sets	♄ Rifes	♃ Sets	♂ Sets	♀ Sets	☿ Rifes	W. flow
1	3	53	8 7	10 A 36	0 M 3	11 A 34	9 A 30	3 M 7	1 41
6	3	49	8 11	10 14	11 A 40	11 21	9 36	3 12	1 52
11	3	46	8 14	9 52	11 21	11 8	9 42	3 18	2 58
16	3	44	8 16	9 31	11 3	10 54	9 44	3 24	Fall 6
21	3	43	8 17	9 8	10 44	10 41	9 45	3 31	1 10
26	3	44	8 16	8 46	10 25	10 26	9 43	9 Sets	1 15

JULY hath xxxi Days.

Full Moon	4 Day 17 min. past 1 in the Aftern.
Laſt Quarter	12 Day 5 min. before 2 Afternoon.
New Moon	20 Day 6 min. past 12 in the Morn.
First Quarter	26 Day 11 min. past 4 Afternoon.

M D	Sun's Declin.
1	23 N 8
6	22 42
11	22 7
16	21 21
21	20 27
26	19 20

1	M	Tres Trin. 4 Ret.	1 M 30	9 A 40	
2	Tu	Viſit. of the B. V. Mary. *Hereford*	2 11	10 34	
3	W	Term ends.	3 0	11 27	
4	Th	City of *Cheſter* 5th, *Lancaſter*, 4. 5. 6.	☽ Riſes	Morn.	
5	F	Old Midſ. Day. *Warwick. Leiceſter.*	8 A 27	0 19	
6	S	Days decreas'd about 18 minutes.	9 0	1 8	
7	✠	4 Sun. after Trin. & bo. a Becket.	9 29	1 55	
8	M	*Now expect good Weather for Hay mak-*	9 53	2 42	
9	Tu	*ers, and for ripening the Fruits of the*	10 16	3 24	
10	W	Old St. Pet. Day. *Peterborough* 3 Day.	10 38	4 8	
11	Th	*Earth in general (but perhaps Rain mo-*	11 0	4 50	
12	F	*derate, or accompanied with Storms, &*	11 23	5 32	
13	S	*Woburn*, Bedf.	11 50	6 15	
14	✠	5 Sunday after Trinity.	Morn.	7 2	
15	M	Swithin.	0 20	7 49	
16	Tu	Days decreas'd above half an hour	0 56	8 40	
17	W	and are now about 16 hours long.	1 42	9 33	
18	Th	*Denbigh. Overton*, Hant. *Chipping*	2 34	10 27	
19	F	☉ Due E. 7 m. aft. 7. [*Norton*, Oxf.	3 35	11 23	
20	S	Marg. V. & M. Antio. *Alfreton*, Derb.	☽ Sets	0 A 22	
21	✠	6 Sunday after Trinity.	8 A 25	1 19	
22	M	Pr. CARO. MATIL. bo. Magdal.	8 56	2 15	
23	Tu	*Derby* 25.	9 26	3 8	
24	W	St. JA. Ap. & Mar. (*Leighton-Buz.* 26	9 54	4 0	
25	Th	St. Anne M. of B. V. Ma. *Portſdown*	10 22	4 52	
26	F	☉ riſing and ſetting Amplit. 33°.	10 54	5 45	
27	S	7 Sunday after Trinity.	11 28	6 40	
28	✠	*Fotheringhay*, Northam. *Winchcomb*	Morn.	7 32	
29	M	Glou.	0 10	8 26	
30	Tu	*Lynton*, Camb.	0 56	9 19	
31	W	Dog Days begin.	1 48	10 11	

M	D	☉ Riſes	☉ Sets	☽ Riſes	♃ Sets	♂ Sets	♀ Sets	☿ Sets	W. ſalt.
1	3	46	8 14	8 A 24	10 A 6	10 A 11	9 A 39	9 A 13	3 15
6	3	49	8 11	8 3	9 48	9 57	9 35	9 19	4 9
11	3	53	8 7	Sets	9 31	9 43	9 28	9 17	4 55
16	3	58	8 2	3 M 10	9 12	9 28	9 20	9 7	5 30
21	4	4	7 56	2 49	8 55	9 12	9 12	8 58	5 50
26	4	11	7 49	2 28	8 37	8 58	9 2	8 44	5 57

AUGUST hath xxxi Days.

	M	D	Son's Declin
Full Moon 3 Day 50 min. past 1 in the Morn.	1		18N 12
Last Quarter 11 Day 9 min. past 6 in the Morn.	6		16 39
New Moon 18 Day 8 min. past 8 in the Morn	11		15 13
First Quarter 24 Day 12 min. past 11 at Night.	16		13 40
	21		12 2
	26		10 20

1	Th	Lammas-Day.	2 M 45	11 A	
2	F	*Mandlin Hill*, Ham. *Newark. Ickleton.*	3 46	11 4	
3	S	*Daventry.* [Camb.	☽ Rises	Morn.	
4	✠	8 S. after Trinity. *Ricester*, Oxf. 5.	7 A 55	0 3	
5	M	*Abingdon* Berks. *Thrapston*, Northam.	8 20	1 2	
6	Tu	Transf. of our LORD. (*Boston*, Lin.	8 42	2	
7	W	Name of JESUS. 4. 5. 6. *Rawenglass.*	9 3	2 4	
8	Th	*This Month we have* [Cumb.	9 26	3 3	
9	F	*reason to expect* (at least hope for)	9 51	4 1	
10	S	St. Laur. Arch. D. of R. & M.	10 20	4 5	
11	✠	9 Sunday after Trinity.	10 55	5 4	
12	M	Old Lammas. *Loughborough*, Leic.	11 34	6 2	
13	Tu	*good seasonable*	Morn.	7 2	
14	W	*Weather for the Harvest; and*	0 22	8 1	
15	Th	*Oswestry*, Salop.	1 17	9 1	
16	F	Day 14 hours and half long.	2 23	10 6	
17	S	☉ due E 6 h. 40′. Alt. 12°. 36′.	3 38	11	
18	✠	10 Sunday after Trinity.	☽ Sets	0 A 2	
19	M	☉ Amplitude North 16° 40′.	7 A 30	1 0	
20	Tu	*if it be not so good as*	7 56	1 5	
21	W	*Rugby. Horncastle.*	8 28	2 5	
22	Th	Day decreas'd 2 hours 3 quarters.	9 0	3 4	
23	F	*some People wish for, let them Fast.*	9 36	4 3	
24	S	St. BART. Ap. & Mart. *Abby-de-la-*	10 17	5 3	
25	✠	11 Sunday after Trinity. [*Zouch.*	11 0	6 2	
26	M	*hope for better,*	11 50	7 1	
27	Tu	*now and to the End.*	Morn.	8 1	
28	W	S. Au. B. of Hip. C. D.	0 45	9	
29	Th	Beheading of JOHN Bap.	1 44	9 5	
30	F	☉ due E. 6h. 30′. Alt. 12° 27′.	2 47	10 3	
31	S	Day 13 ho. 54 min. long.	3 50	11 2	

D	☽	☉ Rises	☉ Set	♄ Sets	♃ Sets	♂ Sets	♀ Sets	☿ Sets	W. sets
1	4	20	7 40	2 M 2	8 A 16	8 A 42	8 A 50	8 A 22	5 47
6	4	27	7 32	1 41	7 59	8 28	8 40	8 1	5 21
11	4	35	7 24	1 20	7 42	8 13	8 30	7 37	4 40
16	4	44	7 16	1 0	7 25	8 0	8 20	7 15	3 48
21	4	53	7 7	0 41	Rises	7 40	8 8	6 44	2 40
26	5	2	6 57	0 22	9 M 45	7 3	7 57	Rises	1 20

SEPTEMBER hath xxx Days.

M D	Sun's Declin.
1	8N 10
6	6 20
11	4 20
16	2 30
21	South
26	1 21

Full Moon 1 Day 50 min past 4 in the Aftern.
Last Quarter 9 Day 40 min. past 8 at Night.
New Moon 16 Day 24 min. past 4 in the Aftern.
First Quarter 23 Day 18 min. past 9 in the Morn.

			☽ Rises	Morn.
1	F	12 Sunday after Trinity.		
2	M	*Now, in all likelyhood we shall*	6 A 58	0 7
3	Tu	☉ Amplitude North 13 degrees.	7 16	0 51
4	W	Old Bart. *Warwick. Brigstock*, North.	7 37	1 3
5	Th	*Ware*, Hertf. *Chipping-Norton*, Oxf.	8 2	2 1[illegible]
6	F	Days decreas'd 3 hours 27 minutes.	8 30	3 [illegible]
7	S	Dog-days end. Enurchus B. of Or.	9 4	3 45
8	F	13 S. after Trin. Nat. of B.V.Mary.	9 38	4 32
9	M	*have foggy Mornings* (*Wirksworth.*	10 21	5 22
10	Tu	*succeeded by fine drying*	11 12	6 12
11	W	Day 12 hours 3 quarters long	Morn.	7 5
12	Th	*weather for Harvest* (St. *Giles Hill*,	0 10	8 [illegible]
13	F	London bur. A.D. 1666 [Hamp.	1 22	8 55
14	S	Holy Cross Day. *Woburn*, Bed.	2 35	9 52
15	F	14 Sunday after Trinity.	3 55	10 48
16	M	☉ Eclips'd invisible.	☽ Sets	11 45
17	Tu	Lambert, B. Sh. & M.	6 A 33	0 A 43
18	W	Ember Week. *Sturbridge.*	7 5	1 39
19	Th	*Abingdon*, Ber. *Staying* Dor. *Waltham.*	7 40	2 36
20	F	*Good Weather still, and to the end Fa.*	8 19	3 33
21	S	St. Mat. Ap. Ev. & Mart. *Silsoe* Bed.	9 3	4 29
22	F	15 Sunday after Trinity.	9 52	5 24
23	M	☉ ♎ 4h. 18′ 40″ Mor. Equ. D. & N	10 49	6 18
24	Tu	in all habitable Parts of the Earth.	11 48	7 9
25	W	*Denbeigh. Shroton*, Dorsetsh.	Morn.	7 58
26	Th	S. Cyprian Arch. of Carth. & M	0 49	8 45
27	F	*Derby*, lasts 3 Days.	1 52	9 30
28	S	*Tuxford*, Nottinghamsh.	2 54	10 1[illegible]
29	F	16 S. after Tr. St. Mich. All Ang.	3 52	10 58
30	M	S. Jer. P.C. & D. *Maidenhead*, Be.	5 0	1 41

M D	☉ Rises	☉ Set	♄ Sets	♃ Rises	♂ Sets	♀ Sets	☿ Ris	W. How.
1	5 15	6 44	11 A 57	4 M 30	7 A 18	7 A 46	3 M 57	0′ 25″
6	5 30	6 30	11 37	4 18	7 57	7 37	1 43	2 0
11	5 38	6 19	11 18	4 6	6 52	7 28	3 51	3 41
16	5 47	6 1[illegible]	11 0	3 54	6 39	7 8	1 9	5 27
21	5 57	6 6	10 43	3 42	6 26	7 10	4 41	7 10
26	6 6	6 [illegible]	10 26	3 30	6 14	7 [illegible]	4 [illegible]	8 52

OCTOBER hath xxxi Days.

M	D	Sun's Declin.
Full Moon 1 Day 3 min after 10 in the Morning.	6	3 S 20
Last Quarter 9 Day a quarter past 9 in the Morning.	1	5 17
New Moon 16 Day half an hour past 1 in the Morning.	11	7 11
First Quarter 22 Day 21 min. past 11 at Night.	16	9 3
Full Moon 31 Day 11 min. past 4 in the morning.	21	10 50
	26	12 36

			☽ Rises	Morn.
1	Tu	Remig. B. of Rhemes. ☽ Ecl. inv.	6A 18	0 25
2	W	Notting. GOOSE FAIR. Old St Mat.	6 43	1 8
3	Th	*Peterborough*, begins 2d. holds 3 Da	7 13	1 52
4	F	*Kettering*, North. 3d. *Derby*.	7 48	2 40
5	S	Days 11 hours Night 13 ho. long.	8 28	3 26
6	✠	17 Sunday after Trinity.	9 15	4 15
7	M	*Abingdon*, Berks.	10 10	5 6
8	Tu	*Pretty favourable for the present,*	11 12	5 58
9	W	St. Denys Areop. B. and M.	Morn.	6 52
10	Th	*Mansfield* Old Mich. Day. *Leicester*	0 22	7 45
11	F	(10 *Steyning*, Suff.	1 37	8 41
12	S	Days decreas'd 6 ho. 5 minutes.	2 58	9 35
13	✠	18 Sunday after Trinity.	4 18	10 30
14	M	Day-break 40 min. after 4.	5 35	11 26
15	Tu	*but we may soon expect*	☽ Sets	0 A 27
16	W	☉ Ecl. invisible.	6A 20	1 26
17	Th	Etheldred, Virg.	7 0	2 23
18	F	St. LUKE the Evangelist.	7 52	3 20
19	S	*Market-Harborough.*	8 45	4 16
20	✠	19 Sunday after Trinity.	9 48	5 9
21	M	Day breaks at 5.	10 51	6 0
22	Tu	K. GEO. II. Cr. 1727. *Newport Pagn*	11 53	6 49
23	W	*to have Winter upon us, with*	Morn	7 35
24	Th	*Leighton-Buzz.* Bedf.	0 54	8 19
25	F	Crispin Mart.	1 56	9 2
26	S	*East*	2 58	9 45
27	✠	20 Sunday after Trinity.	4 1	10 30
28	M	St. SIM. & St. JUDE A. & M *Bingham*	5 5	11 11
29	Tu	*Plasley*, Nott. *Towcester*, North. *Os-*	6 7	11 56
30	W	Day 9 hours 36 min. long. [*westry*	Rises.	Morn.
31	Th	*cold Winds, Rain, Snow, Frost*, &c.		

M	D	☉ Rises	☉ Set	♄ Sets	♃ Rise	♂ Sets	♀ Sets	☿ Rises	W. slow.
1	6	12	5 47	10A 8	3M 18	5 A 16	6 A 5	5 M 50	10 38
6	5	22	5 37	9 50	3 5	5 49	6 48	6 21	12 0
11	5	32	5 27	9 33	2 52	5 30	6 44	Sets	13 20
16	5	42	5 17	9 15	2 40	5 22	6 39	5 A 36	14 30
21	5	51	5 8	8 58	2 27	5 10	6 35	5 27	15 20
26	7	0	5 0	8 40	2 15	4 58	6 36	5 16	15 56

NOVEMBER hath xxx Days.

M D	Sun's Declin.
1	14 S 30
6	16 9
11	17 35
16	18 53
21	20 4
26	21 4

Last Quarter 7 Day 54 min. past 7 at Night.
New Moon 14 Day a quarter before Noon.
First Quarter 21 Day a quarter past 5 Afternoon.
Full Moon 29 Day half past 9 at Night.

1	F	All Saints Day. *Nun Eaton.*	5 A	54	0 M	41
2	S	Prs. of ORANGE b. Cr. An. 1 Ret.	6	28	1	28
3	✠	21 Sund. aft. Trin.	7	15	2	15
4	M	Day break 20 min. after 5.	8	6	3	8
5	Tu	Papists Conspira.	9	2	3	58
6	W	Mich. Term beg Leonard, Conf.	10	12	4	50
7	Th	Day 9 hours 19 minutes long.	11	24	5	43
8	F	O.St. Jude. *Warwick. Chip. Nort* Oxf	Morn.		6	36
9	S	Novem. *Weather, which is likely to be*	0	37	7	20
10	✠	22 S. after Trin. K. GEO. II. born.	1	52	8	27
11	M	Martin Bish. & C.	3	10	9	15
12	Tu	Craft. Mart. 2 Return. Old All Saints	4	33	10	10
13	W	Britius Bish.	5	12	11	5
14	Th	*cold enough now, but colder to the end*	☽ Sets		0 A	4
15	F	Maucutus Bish.	5 A	38	1	3
16	S	Day break 37 min. after 5.	6	30	2	0
17	✠	23 Sunday after Trinity.	7	27	2	57
18	M	Day 8 hours 20 minutes long.	8	31	3	50
19	Tu	Octab. Mart. 3 Return.	9	36	4	40
20	W	Edm. K. and Mart.	10	40	5	28
21	Th	Days decreas'd 8 hours and an half	11	44	6	12
22	F	Cecilia V. & M. O. Mart. D. *Rugby*	Morn.		6	58
23	S	S. Clem. I. B. of R. and M.	0	48	7	40
24	✠	24 Sunday after Trinity.	1	50	8	21
25	M	Prince WILL. HEN. born.	2	52	9	3
26	Tu	Quin. Mart. 4 Returns.	3	54	9	47
27	W	Day 7 hours 3 quarters long.	4	56	10	32
28	Th	Michaelmas Term ends.	5	57	11	18
29	F	*Maidenhead*, Berk. 30. *Chip. Nor.* [*Fast*	☽ Rises		Morn.	
30	S	St. AND. Ap. Prs. Dow. of W. bo.	5 A	5	0	7

M D	☉ Rises	☉ Sets	☿ Set	♃ Rises	♂ Rise	♀ Set	♀ Sets.	W. low.
1	7 12	4 47	8 A 19	1 M 55		5 A 36	5 A 11	16 14
6	7 21	4 38	8 3	1 40		6 38	5 8	16 7
11	7 29	4 30	7 48	1 25		6 41	5 7	15 40
16	7 37	4 22	7 25	1 8		5 44	5 7	14 50
21	7 43	4 15	7 7	0 50		6 47	5 6	13 42
26	7 51	4 8	6 48	0 33		6 49	5 5	12 13

DECEMBER hath xxxi Days.

M D	Sun's Declin.
1	21 S 55
6	22 36
11	23 5
16	23 23
21	23 29
26	23 23

Last Quarter 7 Day at 5 in the Morning.
New Moon 13 Day half past 11 at Night.
First Quarter 21 Day 12 min. past 2 Afternoon.
Full Moon 29 Day 10 min. past 1 in the Aftern.

1	☽		Advent Sunday.	5 A	56	0 M 58
2	M		*There being but few* Fairs	6	54	1 49
3	Tu		*in this Month, is probably*	8	0	2 42
4	W		*owing to the* Foulneſs *of the*	9	7	3 33
5	Th		*Weather*, &c. *which in general*	10	18	4 25
6	F		Nicol. Biſh. of Myra in Licia.	11	30	5 17
7	S		Days decreas'd 9 hours 12 min.	Morn.		6 8
8	☽		2 Sunday in Advent.	0	45	7 0
9	M		*Newark*, upon Trent.	2	4	7 52
10	Tu		*about this time of the Year makes*	3	22	8 44
11	W		Old S:, Andrew. *Abing.* Ber *Baldock*	4	40	9 38
12	Th		Day 7 hours 32 minutes long.	5	53	10 35
13	F		Lucy Virgin and Mart.	☽ Sets		11 32
14	S		*it very uncomfortable Travelling*	5 A	0	0 A 31
15	☽		3 Sunday in Advent.	6	0	1 26
16	M		☽ Sapientia.	7	5	2 19
17	T		Days decreas'd, 9 hours 25 min.	8	10	3 8
18	W		Ember Week.	9	16	3 56
19	Th		Day breaks, and Twilight ends at 6	10	21	4 41
20	F		Day 7 hours 16 minutes long. *Faſt*	11	25	5 24
21	S		St. Thomas A. & M. ♑ 8h. 10' 40 Mo	Morn.		6 5
22	☽		4 Sunday in Advent. ſhorteſt Day.	0	26	6 47
23	M		*Newport Pagnel*, always 22d.	1	26	7 29
24	Tu		Greateſt Dec. of Days 9h. 25 m. *Faſt*	2	28	8 13
25	W		Christmas Day.	3	30	8 59
26	Th		St. Stephen Proto-Martyr.	4	33	9 45
27	F		St. John Ap. and Evangeliſt.	5	32	10 31
28	S		Innocents Day, Herod's Murd. Infa.	6	31	11 27
29	☽		1 Sunday after Chriſtmas.	☽ Riſes		Morn.
30	M		*Chriſtmas Weather to the End.*	5 A	32	0 21
31	Tu		Silveſter. Biſhop of Rome.	6	38	1 15

M d	☉ Riſes	☉ Sets	♄ Sets	♃ Riſes	♂ Riſes	♀ Sets	☿ Sets	☽ new.
1	7 37	4 3	6 A 29	0 M 14		6 A 51	4 A 54	10 25
6	8 1	3 59	6 9	11 A 51		6 50	4 31	8 20
11	8 5	3 55	5 50	11 32		6 48	Riſes	6 6
16	8 7	3 53	5 31	11 12		6 40	6 M 40	3 40
21	8 8	3 52	5 11	10 50		6 28	5 14	1 10
26	8 7	3 53	4 51	10 28		6 14	5 8	Faſt

A TABLE of all the Kings and Queens of *England* since the Conqueſt.

Names.	The Year of the Birth of each King and Queen; alſo the Year, Month, and Day, whereon they began to reign: beginning the Year the firſt Day of January. 1754. Born.	Began to Reign.	The Length of each Reign. Y.	M.	D.	The Years expired ſince each Reign began and ended. Beg	End
William Conq.	1027	1066 October 14	20	10	26	688	667
William Rufus	1057	1087 Septem. 9	12	10	24	667	654
Henry I.	1058	1100 Auguſt 2	35	4	0	654	619
Stephen	1105	1135 Decem. 1	18	10	24	619	600
Henry II.	1134	1154 October 25	34	8	11	600	565
Richard I.	1156	1189 July 6	9	9	0	565	555
John	1166	1199 April 6	17	6	13	555	538
Henry III.	1207	1216 October 19	56	1	0	538	482
Edward I.	1239	1272 Novem. 16	34	7	21	482	447
Edward II.	1284	1307 July 7	19	6	15	447	427
Edward III.	1312	1327 January 20	50	5	1	427	377
Richard II.	1366	1377 June 21	22	3	8	377	355
Henry IV.	1367	1399 Septem. 29	13	5	21	355	341
Henry V.	1389	1413 March 20	9	5	11	341	332
Henry VI.	1421	1422 Auguſt 31	38	6	4	332	293
Edward IV.	1442	1461 March 4	22	1	5	293	271
Edward V.	1471	1483 April 9	0	2	13	271	271
Richard III.	1443	1483 June 22	2	2	0	271	269
Henry VII.	1457	1485 Auguſt 22	23	8	0	269	244
Henry VIII.	1492	1509 April 22	37	9	6	245	207
Edward VI.	1537	1547 January 28	6	5	8	207	201
Mary I.	1516	1553 July 6	5	4	11	201	196
Elizabeth	1533	1558 Novem. 17	44	4	7	196	151
James I.	1566	1603 March 24	22	0	3	151	129
Charles I.	1600	1625 March 27	23	10	3	129	105
Charles II.	1630	1649 January 30	36	0	7	105	69
James II.	1633	1685 February 6	4	0	7	69	65
Mary II.	1662	1689 Feb. 13	5	10	15	65	52
William III.	1650	1689 Feb. 13	3	0	25	65	52
Anne	1665	1702 March 8	12	4	24	52	40
George I.	1660	1714 Auguſt 1	12	10	10	40	27
George II.	1683	1727 June 11	whom God preſerve.				

A Compendious TABLE of INTEREST,

shewing the Interest of any Sum of Money, from a Million to a Pound; for any Number of Days, at any Rate of Interest.

No.	l.	s.	d.	q.
1000000	2739	14	6	0 ,99
900000	2465	15	0	3 ,29
800000	2191	15	7	1 ,59
700000	1917	16	1	3 ,89
600000	1643	16	8	2 ,19
500000	1369	17	3	0 ,49
400000	1095	17	9	2 ,79
300000	821	18	4	1 ,09
200000	547	18	10	3 ,40
100000	273	19	5	1 ,70
90000	246	11	6	0 ,32
80000	219	3	6	0 ,96
70000	191	15	7	1 ,59
60000	164	7	8	0 ,22
50000	136	19	8	2 ,85
40000	109	11	9	1 ,48
30000	84	3	10	0 ,11
20000	54	15	10	2 ,74
10000	27	7	11	1 ,37
9000	24	13	1	3 ,23
8000	21	18	4	1 ,10
7000	19	3	6	2 ,96
6000	16	8	9	0 ,82
5000	13	13	11	2 ,58
4000	10	19	2	0 ,55
3000	8	4	4	2 ,41
2000	5	9	7	0 ,27
1000	2	14	9	2 ,14

No.	l.	s.	d.	q.
1000	2	14	9	2 ,14
900	2	9	3	3 ,12
800	2	3	10	0 ,11
700	1	18	4	1 ,10
600	1	12	10	2 ,80
500	1	7	5	3 ,70
400	1	1	11	0 ,50
300	0	16	5	1 ,40
200	0	10	11	2 ,30
100	0	5	5	3 ,01
90	0	4	11	0 ,71
80	0	4	4	2 ,41
70	0	3	10	0 ,11
60	0	3	3	1 ,81
50	0	2	8	3 ,51
40	0	2	2	1 ,21
30	0	1	7	0 ,90
20	0	1	1	0 ,60
10	0	0	6	2 ,30
9	0	0	5	3 ,67
8	0	0	5	1 ,40
7	0	0	4	2 ,41
6	0	0	3	3 ,76
5	0	0	3	1 ,15
4	0	0	2	2 ,52
3	0	0	1	3 ,80
2	0	0	1	1 ,26
1	0	0	0	2 ,63

RULE.

Multiply the Sum by the Number of Days; and that Product by the Rate per Cent. Then cut off the two last Figures to the right Hand, and the rest you must find in the Table.

Example, What is the Interest of 100 l. for 365 Days at 5 per Cent

No. of Days 365	Then in the Table
multiply by 100	against 1000 is 2 14 9 2 ,14
Product 36500	800 2 3 10 0 ,11
multiply by 5 Rate p. Cent.	60 0 1 1 0 ,60
182500	5 0 0 3 1 ,15
	Answ. 5 0 0

THERE will be in this Year Six Eclipses, but all invisible to this Part of the Globe, *viz.* Four of the SUN and Two of the MOON; in the following Order.

The First of the SUN, the 23d Day of *March*, at 10 *P. M.* the *Sun* in *Aries* 3° 13′.

Second of the MOON, *April* 7, visible and total at *Jamaica*; and will begin there at 54 Min. past Midnight, the Middle 36 Min. past 2 in the Morn. and ends 18 Min. past 4.

Third of the SUN, *April* 22, at 45 Min. past 1 Afternoon, *Sun* in *Taurus* 2° 9′.

Fourth of the SUN, *Sept.* 16. at 46 Min. past 4 Afternoon, *Sun* in *Virgo* 23° 30′.

Fifth of the MOON, *October* 1, visible at *Jamaica*, and total; begins 28 Min. past 3 Morn. Middle 26 Min. past 5, and sets Eclipsed.

Sixth of the SUN, *October* 16, at 32 Min. past 1 in the Morning, *Sun* in *Libra* 22° 35′.

T. C. Writing-master, in *Tinker Close*, near the *Fort Mill Hill*.

IN the Year 1754, will be Six Eclipses, *viz.* Four of the SUN, and Two of the MOON; but none of them visible to the Inhabitants of *Great Britain*; tho' Mr. *Leadbetter* has made both those of the MOON visible in his *Compleat System of Astronomy*; which is as gross an Absurdity as his Geometrical Construction of a Solar Eclipse, so erroneously copied from Mr. *Flamstead*, and publish'd in the latter end of his *First Vol. of the System aforesaid*. These Two Lunar Eclipses however, perhaps may not be thought altogether unworthy the Notice of the Curious, in *America*; on which Account you have the following Calculation of Both, for *Port Royal* in *Jamaica*.

Apparent Time at *Port Royal* of the		D.	H.	′	″
	Beginning *Anno* 1754, *April*	6	12	53	07
	Beginning total Darkness		13	49	56
	Ecliptic ☌		14	38	36
	Middle		14	38	54
	End of total Darkness		15	27	52
	End of the Eclipse		16	24	41
	Duration of total Darkness		01	37	56
	Total Duration of the Eclipse		03	31	34
	Digits Eclipsed		21	41	24
	Moon's true Latitude	S. D.	01	54	

The Second will fall on *October* 1; and the Inhabitants of *Port Royal* will perceive the MOON to set when about half of her Diameter is obscured by the *Earth's* Shadow.

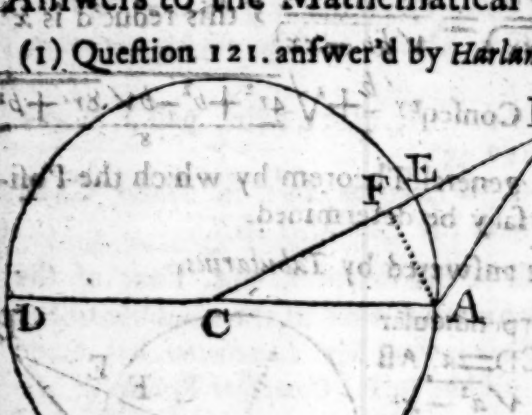
Apparent Time at Royal of the

	H.	′	″
Beginning, *Anno* 1754, *April* 30	14	58	46
Beginning total Darkneſs	16	04	18
Ecliptic & Middle	16	56	26
	16	56	48
End of total Darkneſs	17	49	18
End of the Eclipſe	18	54	50
Duration of total Darkneſs	1	45	00
Total Duration of the Eclipſe	3	56	04
Digits eclipſed	21	01	25
Moon's true Lat.	S.	D.	
	1	31	

Harland Widd.

Anſwers to the Mathematical Queſtions in 1753.

(1) Queſtion 121. anſwer'd by *Harland Widd*, the Propoſer.



HE firſt obſerves, that this Queſtion was propoſed by the *Provoſt* of *Dunbar*, when the *Town Mills* were building; in order to place AB on the Bucket Wheel ſo as to carry the greateſt Quantity of Water to the Horizontal Poſition.

Let fall the Perpendicular AF, for which put x; alſo let r = AC. and b = AB: Then (*per* 47 E. 1.) $\sqrt{rr-xx}$ = CF, and $\sqrt{bb-xx}$ = BF; whence $\sqrt{rr-xx}+\sqrt{bb-xx}$ = BC, which multiply'd by $\frac{x}{2}$ = half AF, gives the Area of the Δ ABC = $\frac{x}{2}\sqrt{rr-xx}+\frac{x}{2}\sqrt{bb-xx}$. The Fluxion of which is $\frac{rr\dot{x}x-2x^3\dot{x}}{2\sqrt{rrxx-x^4}}+\frac{bb\dot{x}x-2x^3\dot{x}}{2\sqrt{bbxx-x^4}}$. Now the Square of the Fluxion of AF, being $\dot{x}^2$, and of CF, $\frac{-x^2\dot{x}^2}{rr-xx^2}$; the ſquare Root of their Sum is $\frac{r\dot{x}}{\sqrt{rr-xx}}$ = the Fluxion of the Arch AE; which being multiply'd by half AC = $\frac{r}{2}$ gives $\frac{rr\dot{x}}{2\sqrt{rr-xx}}$ = the Fluxion of the Area of the Sector ACE; but by the Nature of

of the Question the Area of the Sector ACE, taken from the Area of the Triangle ABC, is to leave the Area AEB a *Maximum*: Therefore the Fluxion of the Sector AEB taken from the Fluxion of the Triangle ABC $=0$, that is; $\frac{rr\dot{x}-2x^3\dot{x}}{2\sqrt{rrxx-x^4}}+\frac{bb\dot{x}\dot{x}-2x^3\dot{x}}{2\sqrt{bbxx-x^4}}-\frac{xr\dot{x}}{2\sqrt{rr-xx}}=0$: Divide $\frac{\dot{x}}{2}$ and expunge x where it is common, so will $\frac{rr-2xx}{\sqrt{rr-xx}}+\frac{bb-2xx}{\sqrt{bb-xx}}-\frac{rr}{\sqrt{rr-xx}}=0$; whence by Transposition $\frac{2xx}{\sqrt{rr-xx}}=\frac{bb-2xx}{\sqrt{bb-xx}}$; this reduc'd is $x^4-b^2x^2-\frac{b^4}{4rr}x^2=\frac{b^4}{4}$, Conseq^{tly} $\frac{b}{2}+\sqrt{\frac{4r^2+b^2-b\sqrt{8r+b^2}}{8}}=x=$AF; which is a general Theorem by which the Position of AB may universally be determined.

The same answered by *Tabularius*.

First, AF and DC perpendicular to BC; and put AC$=$CD$=a$, AB $=c$, CF$=x$, AF$=\sqrt{a^2-x^2}$, and BF$=\sqrt{c^2-a^2+x^2}$; then the Area of the $\triangle$ABF will be expressed by $\frac{\sqrt{a^2-x^2}\times\sqrt{c^2-a^2+x^2}}{2}$.

Now the Quadrant CEAD being constant, the mixtilineal Area ABE will be a *Maximum* when the Area ADCF $+$ Area of the Triangle ABF is a *Maximum*; therefore the Sum of their Fluxions must be equal to nothing, *viz.* $\frac{2a^2x\dot{x}-c^2x\dot{x}-2x^3\dot{x}}{2\sqrt{c^2-a^2+x^2}\times\sqrt{a^2-x^2}}+\dot{x}\sqrt{a^2-x^2}=0$; and $2x^3+c^2x-2a^2x=a^2-x^2\times 2\sqrt{c^2-a^2+x^2}$, whence by Involution and Reduction $x^4+\frac{c^4}{4a^2}+c^2-2a^2\times x^2=a^2c^2-a^4$; in which writing $2m=\frac{c^4}{4a^2}+c^2-2a^2$, we have $x=\sqrt{m+\sqrt{a^2c^2-a^4+m^2}}$. When $a=c=1$, $x^4-1,75x^2=0$, $\therefore x^2=,75$, and $x=$S. $60^\circ=\angle$CAF$=\angle$BAF.

The same answer'd by Mr. *William Enefer*.

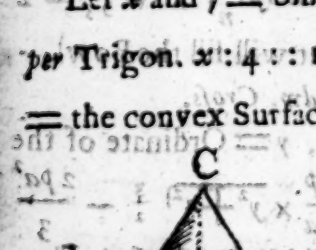
Let the two given Lines be to each other as 1 to a; then AC $= 1$, AB $= a$: Put $x =$ Sine $<$ ACB, then its Cosine $= \sqrt{1-x^2}$, and (by *Emmerson's* Trig. Prop. xi. pag. 25.) $\frac{x}{\sqrt{1-x^2}}$ = the Fluxion of the Arch AE; which, by the Nature of the Circle is also the Fluxion of the Sector CAE, by Trigon. $a : x :: 1 : \frac{x}{a} =$ Sine $<$ B, then $\sqrt{1-\frac{xx}{aa}} =$ its Cosine, and $x\sqrt{1-\frac{xx}{aa}} + \frac{x}{a}\sqrt{1-xx} =$ Sine $<$ BAC, which multiply'd by a gives $x\sqrt{a^2-x^2} + x\sqrt{1-x^2} =$ double the Area of the Triangle ABC, whose Fluxion is $\frac{a^2x\dot{x}-2x^3\dot{x}}{\sqrt{a^2-x^2}} + \frac{x\dot{x}-2x^3\dot{x}}{\sqrt{a^2-x^2}}$, which by the Nature of the Problem must be $= \frac{\dot{x}}{\sqrt{1-x^2}}$ the Fluxion of the Sector, divide by $\dot{x}$, and transpose the Equation and $\frac{a^2-x^2}{\sqrt{a^2-x^2}} = \frac{2x^2}{\sqrt{1-x^2}}$ which brought out of Fractions and properly ordered will be $4x^4 - \overline{a^4 - 4a^2} \times x^2 = -a^4$: or (putting $\frac{a^4+4a^2}{4} = 2m$, and $\frac{a^4}{4} = n$) $x^4 - 2mx^2 = -n$, then $x = \sqrt{m \pm \sqrt{m^2-n}}$.

W. W. D.

Mr. *Wm. Cottam*, Mr. *Wm. Kingston*, Mr. *Tho. Most*, Mr. *Sam. Bamfield*, Mr. *Ben. Down*, Mr. *Tho. Garrard*, and others, have solv'd this Quest. but Room will not admit.

(2) Quest. 122. answer'd by Mr. *W. Bevil*.

Let x and $y =$ Sine and Cosine $<$ A, $b = 1{,}570796$. Then *per* Trigon. $x : 4 :: 1 : \frac{4}{x} =$ ACx : 4 :: $y : \frac{4y}{x} =$ AD, and $\frac{32by}{x^2}$ = the convex Surface of the Glass, which *per* Quest. $= 64by^2$ twice the Area of the Brim. Whence $y = \frac{1}{2} = 30° =$ $<$ACD; hence 22,34 = its Content.



Again, Let $p = 3.1416$, $b = 12 =$ Depth of the Bowl, and for Diam. at Brim put $2y$; then (by *Emerson's Fluxions*, p. 202.) we have the convex Surface

Surface $= \frac{p}{6a} \times \overline{a^2+4y^2}^{\frac{3}{2}} - \frac{pa^2}{6} = 2py^2$ per Queſt. and $y^2 = ab$ (by the Nature of the Curve) which being put for y^2, and the whole divided by $\frac{p}{6}$ we have $\frac{\overline{a^2+4ab}^{\frac{3}{2}}}{a} - a^2 = 12ab$. From which we get $3a^2 + 24ab = 16b^2$, Solv'd $a = 7.425625$, and $y = 9.4396$. Hence the Content of the Bowl $= 1679,6407$, out of which the Glaſs may be fill'd 75,184 Times.

The ſame anſwer'd by Mr. *Tho. Garrard*.

Put $c = 12$ the given Depth of the Bowl, $p = 3.1416$ (the Circumference of a Circle whoſe Diameter is Unity) x any variable Abſciſſa, and y its correſponding Semi Ordinate: Then by the Nature of the Parabola $ax = y^2$, $2py\sqrt{a^2+4y^2}$ = the Fluxion of the concave Surface of the Bowl; whoſe Fluent corrected is $\frac{p}{6a} \times \overline{a^2+4y^2}^{\frac{3}{2}} - \frac{paa}{6}$, which when x becomes $= c$ and $y^2 = ca$ is $\frac{p}{6a} \times \overline{a^2+4ca}^{\frac{3}{2}} - \frac{paa}{6}$ the concave Surface of the whole Bowl $= 2pac$ the double Area of the Baſe or Brim $\because \overline{a^2+4ac}^{\frac{3}{2}} = \overline{aaa+12caa}^{2}$, which being involved and the Terms contracted &c. gives $a^2+8ca = 5\frac{1}{3}cc \because a = c\sqrt{21\frac{1}{3}} - 4$, and $\frac{pacc}{2} = pc^2\sqrt{5\frac{1}{3}} - 2$, the Solidity of the Bowl.

Now put $n = 4$, the given Depth of the conical Glaſs, and $v =$ the Diameter of its Brim; then will $pv\sqrt{n^2+v^2}$ be the concave Surface of the Glaſs, and $2pvv =$ the Double Area of its Brim $\because \sqrt{nn+vv} = 2v$ and $v = n\sqrt{\frac{1}{3}}$ and $\frac{pn^3}{9}$ is the Solidity of the Glaſs. Conſequently $\frac{9c^3}{n^3} \times \sqrt{5\frac{1}{3}} - 2 = 75.18439$ the Number of Glaſſes that will fill the Bowl.

The ſame anſwer'd by Mr *Edw. Croſs*.

Put $2a =$ *Latus Rectum*, $x =$ *Abſciſſa*, $y =$ Ordinate of the Parabola, $p = 3,1416$, $d = 12$, then $\frac{2p}{3a} \times \overline{y^2+a^2}^{\frac{3}{2}} - \frac{2pa^2}{3} =$ the Conoid's Surface (ſee p. 202. of Mr. *Emmerſon's Fluxions*) $\frac{2p}{3a} \times \overline{y^2+a^2}^{\frac{3}{2}} - \frac{2paa}{3} = 2py^2$ per Queſt. Then

by Reduction, and putting $2ad$ for y^2, we have $4dd = 3a^2 + 12ad$, Solv'd $a = 3,7128$, $y = 9,4396$, then $\frac{dpy^2}{2} = 1679,6352$ the ſolid Content of the Conoid.

Again, For the conical Glaſs put $2y =$ the Diam. $n = 4$, we have $py\sqrt{n^2+y^2} = 2py^2$. Reduc'd $y^2 = \frac{n^2}{3} = 5,3333$. Hence $22,34 =$ the ſolid Content of the conical Glaſs. Therefore 75.185 is the Number of Times the Glaſs may be fill'd out of the Punch-bowl.

The ſame anſwer'd by Mr. *Paul Sharp*.

Put $b = 4$, $c = 3,1416$, and $2y =$ the internal Diam. of the Glaſs ſought; then will $cy\sqrt{b^2+y^2} = 2cy^2$ *per* Queſt. Therefore $b^2 + y^2 = 4y^2$, and $y = \frac{b}{\sqrt{3}} = 2,30942$ Inches, and conſequently the Content of the Glaſs is 22.34024 cylindric Inches. *Secondly*, Let $a = 12$, $c = 3.1416$ as before, and $2x =$ the internal Diam. of the Bowl ſought; then *per* Conics $\frac{x^2}{a} =$ the Parameter; and by the Doctrine of Fluxions we have the concave Surface $= \frac{ac}{6x^2} \times \frac{x^4+4a^2x^2}{a^2}^{\frac{3}{2}} - \frac{cx^4}{6a^2} = 2cx^2$ (*per* Qu.) $\therefore \frac{x^4+4a^2x^2}{a^2}^{\frac{3}{2}} = \frac{12a^2x^4+x^6}{a^3}$, which ſquared and reduced gives $x^4 + 8a^2x^2 = 5\frac{1}{3}a^4$; whence $x^2 = \frac{8a^2}{\sqrt{3}} - 4a^2 = ,6188a^2 = 89,1072 \therefore x = a\sqrt{,6188} = 9,4396$ Inches, the Radius of the Bowl ſought, and the Solidity $= 1679,635077$ cylind. Inches, which divided by the above Content of the Glaſs, gives 75,18428 the Number of Glaſſes required.

The ſame anſwer'd by *Tabularius*.

Let $c = 3,1416$, $d =$ Depth of the Glaſs. $x =$ the Radius of its Brim within; then the Area of the Brim $= cx^2$, and the internal Surface $= cx\sqrt{a^2+x^2} = 2cx^2$, by the Queſt. whence $x = \frac{d}{\sqrt{3}}$, and thence the Content of the Glaſs $= \frac{cd^2}{3} \times \frac{d}{3} = \frac{cd^3}{9}$.

Again, Put $b =$ the Depth of the Bowl, $v =$ the Diam. of the generating Parabola: Then will $bcv =$ Area of the Brim, and

and the internal Surface $= \frac{c}{6v} \times \overline{v^2+4bv}^{\frac{3}{2}} - \frac{cv^3}{6} = 2bcv$ by the Question $\therefore \overline{v^3+12bv}^2 = \overline{v^2+4bv}^3$; whence by Involution and Reduction $v^2+8bv = \frac{64b^2}{12}$, and thence $v = \frac{8b}{\sqrt{3}} - 4b$. Hence the Content of the Bowl $= \frac{b^3}{\sqrt{3}} \times \frac{4-2\sqrt{3}}{3}$; $\therefore \frac{b^3 \times 46 - 18\sqrt{3}}{a^3\sqrt{3}}$ expresses the Number of Times requir'd.

The same answer'd by Mr. *Edw. Rogers*.

Let $n = 4$ = Depth of the Glass, $p = 3.1416$, and x = the Semidiam. of its Brim, then will $x\sqrt{n^2+x^2} = 2x^2$, $\therefore x = \frac{n}{\sqrt{3}} = 2,3094$, and the Content is 22 34015 Cubic Inches.

Put d = the Depth of the Punch Bowl = 12, and y = its Semidiam. then py^2 = Area of the Brim, and (by *Robertson's Mensuration*, p. 293) the internal concave Surface is $\sqrt{4d^2+y^2} + \frac{y^2}{\sqrt{4d^2+y^2}} + y \times \frac{2py}{3} = 2py^2$ (by the Quest.) this Equation properly reduced gives $y = d\sqrt{\frac{x}{\sqrt{3}} - 4} = 9,4396$; whence the Content is 1679,60908 Cubic Inches, which divided by those contained in one Glass gives 75,18342 the Number of Glasses.

The same answer'd by Mr. *William Spicer*.

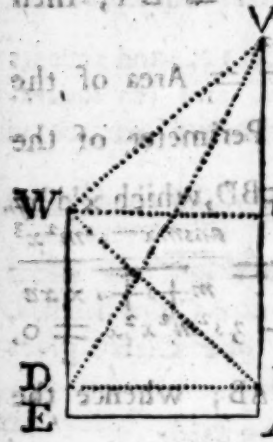
Put $d = 4$ Inches = Cone's Altitude, $c = 0.7854$, and x = the Radius of the Cone's Base; then will $\overline{x^2+a^2}^{\frac{1}{2}}$ = slant the Height: Th. $4x\sqrt{x^2+d^2}$ = Curve Superficies. and $4cx^2$ = Superficies of the Base; hence (*by* Qu.) $4cx\sqrt{x^2+d^2} = 8cx^2$; Solv'd $x = \frac{d}{\sqrt{3}} = 2,3094$, and $\frac{4cd^3}{9} = 22,340266$ Cubic Inches = Cone's Solidity.

Again, Let $b = 12$ Inches = Conoid's Altitude, y = Rad. of Base, and a = Parameter, then (*per* Nature of Curve $ba = y^2$, and $4cba$ = Area of the Base; the Fluxion of the Curve Surface is $\frac{8cyj\sqrt{a^2+4y^2}}{a}$ whose Fluent (when corrected) is $\frac{2c}{3a} \times \frac{a}{a^2+4y^2}^{\frac{3}{2}} - \frac{2ca^2}{3}$, or by putting ba for y^2, we have $\frac{2c}{3a} \times \overline{a^2+4ba}^{\frac{3}{2}} - \frac{2ca^2}{3}$ = Curve Surface. Therefore (by Quest.

Quest.) $\frac{2c}{3^{\frac{3}{2}}} \times \sqrt{a^2 + 4b^2}^{\frac{3}{2}} - \frac{2ca^2}{3} = 8b^2c$; Solv'd $a = \frac{8b}{\sqrt{3}}$
$-4b = 7,4256$, and $\sqrt{\frac{8b}{\sqrt{3}}^2 - 4b^2} = y = 9,4396$; hence $\frac{16b^3}{\sqrt{3}}$
$= 8b^3c = 1679,6350\,7712$ = Conoid's Solidity, and therefore
$\frac{2,78 \times 16^3}{d^3} = 75,18447$ times the Glass may be fill'd in one Bowl.

Many more Solutions to this Question might have been exhibited from Mr *Ben. Donn*, Mr *J. Watchorne*, Mr *Wm. Eneser*, Mr *John Wigglesworth*, Mr *Wm. Kingstone*, Mr *Rich. Gibbons*, Mr *Robt. Butler*, Mr *John Woolley*, *Jack Careless*, Mr *Sam. Bamfield*, Mr *J. Holden*, &c. but we have already been too prolix.

(3) Question 123. answered by *Nummularius*.



For DW = 30 Feet put a, for the Tang^t of the Angle BWV = 56° 19′ put t, and for DB = WC put x; then (*per* plain Trig.) $x : 1 :: a : \frac{a}{x}$ = Tang. < DBW = < BWC; and $\frac{x}{a}$ = its Cot. = Tang^t < BWD = < CBW; and (*per Thacker's Miscell.* Theo. vii. and viii. p. 4.) we have $\frac{tx-a}{at+x}$ = Tang. of CWV = BVD (*per* Quest.) also $\frac{at+x}{tx-a}$ its Cot. = Tang. of CVW = BDV. Then per Trigonom. $\frac{tx-a}{at+x} : x :: 1 : \frac{atx+xx}{tx-a}$ = BV, and $\frac{at+x}{tx-a} : x :: 1 : \frac{tx^2-ax}{at+x}$ = VC. But VC + BC = BV (*per* Fig.) that is $\frac{tx^2-ax}{at+x} + x = \frac{atx+xx}{tx-a}$; this Equation properly reduced will become $x^3 - \frac{3at}{t^2-1} \times x^2 = \frac{a^3t}{t^2-1}$, which in Numbers is $x^3 - 107,9252x^2 = 32277,5575$; this solv'd gives $x = 110\,5563$, and consequently the Height of the Maypole = 131,54. = AV.

N. B. This is the only true Solution received to this Quest. it being propos'd in such very ambiguous Terms, most of our Contributors have miss'd the Meaning of it. We desire that every future Question intended for our *Diary* may be intirely new, not taken from any printed Author, (except the Proposer has made some very great Improvement in the Solution) and propos'd in as clear and perspicuous a manner, as the Nature of the thing will admit: In order to which, we presume good plain Prose will

will be thought by most of our ingenious Correspondents much preferable to Verse: for we imagine the Satisfaction but small when there is more Difficulty to find the *Data* in a Question, than to give a *Solution* after that is found; which too often has happen'd to be the Case.

(4) Question 124, answer'd by Mr. *John Nichols*.

Let r = Sine $\angle A$ = 60°, m = Sine $\angle B$ = 50°, n = Sine $\angle E$ = 70°, a = 100 = Superficies, put x = AB; then (*per* Trigonometry we have) $n : x :: m : \frac{mx}{n}$ = AE, $n : x :: s : \frac{sx}{n}$ = BE, then $\frac{mx}{n} + \frac{sx}{n} + x$ = the Perimeter of the Base; and (*per* Trig.) $1 : \frac{mx}{n} :: s : \frac{smx}{n}$ = E P, then $\frac{smx^2}{n}$ = Area of both Ends, and $a - \frac{smx^2}{n}$ = Area of the three Faces, which being divided by the Perimeter of the End gives $\frac{an - smx^2}{m+s+n \times x}$ = the Length AC = BD, which x'd by $\frac{smx^2}{2n}$ the Area of the End, gives the Solidity = $\frac{ansmx - s^2m^2x^3}{m+s+n \times xn}$ a *Maximum*, and in Fluxions $ansm\dot{x} - 3s^2m^2x^2\dot{x} = 0$, which gives $x = \sqrt{\frac{an}{3sm}} = 6,871317 = AB$; whence the Solidity = 59.0843.

The same answer'd by Mr. *Geo. Godhelp*.

Let ABDC be the Prism required, where the Angles at A, B, and E are 60°, 50°, and 70° respectively, whose Sines call b, a, and c; put x = AB, and y = AC, the Length; then (*per* Trig.) $c : x :: a : \frac{ax}{c}$ = AE, and $c : x :: b : \frac{bx}{c}$ = EB, $\therefore \frac{axy}{2c} + \frac{bxy}{c} + xy + \frac{bax^2}{c} = 100 = d$. Reduc'd $y = \frac{dc - bax^2}{ax + bx + cx}$. Now $\frac{bax^2}{2c} \times \frac{dc - bax^2}{a+b+c \times x}$ = Solidity of the Prism a *Max.* whose Fluxion is $bacd\dot{x} - 3b^2a^2x^2\dot{x} = 0$, $\therefore x = \sqrt{\frac{dc}{3ba}} = 6,87134$. Then $y = 3,545013 = AC$, AE = 5,50165, BE = 6,33265, and the Solidity 59,083795.

The

The same answer'd by Mr. T. C.

Let ABDC (see the Fig. above) represent the Prism in which are given the Angle A = 60° = r, the Angle B = 50 = n, and Angle E = 70 = q, the superficial Content = 100 call (a) Let x = AB, and y = AC the Length of the Prism; then (per Trigon.) $\frac{nx}{q}$ = AE, $\frac{sx}{q}$ = BE; but $x \times s \times \frac{nx}{q}$ = the Sum of the Areas of the Ends, and $\frac{xy+xny+xys}{q}$ = the Area of the 3 Parallelograms ∴ $a - \frac{snx^2}{q} = xy\frac{+xny+xys}{q}$, which brought out of Fractions and reduc'd gives $y = \frac{qa-snx}{nx+sx+qx}$, which Expression multiply'd into $\frac{snx^2}{2q}$ = the Solidity of the Prism which is to be a *Maximum*; therefore $\frac{qa-snx}{nx+sx+qx} \times \frac{snx^2}{2q}$ thrown into Fluxions makes $aqsn\dot{x} - 3s^2n^2x^2\dot{x} = 0$, reduc'd $x = \left.\frac{aq}{3sn}\right|^{\frac{1}{2}}$, which is = 6,8713, and y = 3,5451.

The same answer'd by Mr. *Tho. Garrard*.

Put *a*, *b*, and *c* for the Nat. Sines of 50°, 60°, and 70°, the given Angles of the triangular Base of the Prism, and let *ax*, *bx*, and *cx* represent the Sides opposite to those Angles respectively; also let *d* = 100, the given Surface of the Prism: Then will *abcxx* express the Area of both Bases, and $\frac{d-abcxx}{x \times a+b+c}$ the Height of the Prism, also $\frac{abcxx \times d-abcxx}{x \times a+b+c}$ = the Solidity which by the Quest. is a *Maximum* ∴ $a\dot{x} - 3abcx^2\dot{x} = 0$, ∴ $x\dot{x} = \frac{d}{3abc}$, which being wrote for $x\dot{x}$ in the Expression for the Solidity it will become $\frac{d}{a+b+c} \times \sqrt{\frac{dabc}{27}}$ = 59,08436 = the Solidity of the Prism required.

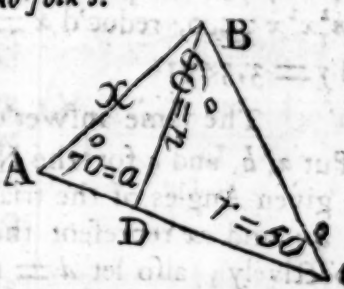
The same answer'd by Mr. *J. Holden*.

Let the Area of the Triangle whose Angles are 50°, 60°, and 70°, and its greatest Side = 1 be called *a*, and its Perimeter *b*; then the Area of any other Triangle whose Angles are the same, and its greatest Side = *x* will be ax^2, and its Perimeter = *bx*; and because the Superficies of a Prism is equal twice the Area of the End *plus* the Product of the Perimeter into

into the Length ($= \frac{1}{2}ax^2 + bx \times$ Length) when the Superficies is given $= g$, the Length will $= \frac{g - 2ax^2}{bx}$, and the Solidity $=$ the Area of the End $\times$ the Length will give $\frac{gax}{b} - \frac{2a^2x^3}{b}$ whose Fluxion made $= 0$, gives $\frac{ga}{b} = \frac{ba^2x^2}{b}$; whence $x^2 = \frac{g}{6a}$, and the Solidity $\sqrt{\frac{g}{6a}} \times \frac{2ga}{36} = \frac{g}{36} \times \sqrt{\frac{2ga}{3}}$; but $g = 100$, therefore $b = \frac{\text{Sin. } 50^\circ + \text{S. } 60^\circ + \text{S. } 70^\circ}{\text{S. } 70^\circ}$, and $a = \frac{\text{S. } 50^\circ \times \text{S. } 60^\circ}{\text{S. } 70^\circ}$, which gives the requir'd Solidity $= 59.08434$.

Corol. Hence the Solidity of any Prism of a given Surface will be greatest when the Area of its End is $= \frac{1}{6}$ of its whole Area.

The same answer'd by Mr. *William Cottam*, at his Grace the Duke of *Norfolk's*.



First let the Sines of the Angles be as the Figures and Letters denote, Rad. $= 1$, and $AB = x$; then $r : x :: n : \frac{nx}{r} = AC$, and $r : x :: a : \frac{ax}{r} = BC$ $\because 1 : x :: a : ax = BD$, and $\frac{nax^2}{r} = 2 \times$ Area ABC; let $c = 100$, and $v =$ the Length of the Prism, then $\frac{n+a+r}{r} \times vx + \frac{nax^2}{r} = c$, $\therefore v = \frac{cr - nax^2}{n+a+r \times x}$ and $\because \frac{na}{rx+a+n} \times \overline{crx - nax^3} =$ to the Solidity; and therefore $crx - nax^3$ is a *Maximum* whose Fluxion is $\dot{x} \times \overline{cr - 3nax^2} = 0$, and $\because x = \sqrt{\frac{cr}{3na}} = 5.601545$, and the Solidity $= 59.0793$.

Mr *Wm Bevil*, Mr *Rich. Mallock*, *Tabularius*, Mr *John Watchorne*, Mr *Jos. Scot*, Mr *Tho. Moss*, Mr *Paul Sharp*, Mr *Wm Wigglesworth*, Mr *Wm Kingstone*, Mr. *Rob. Butler*, *Jack Careless*, Mr *Edw. Cross*, Mr *Sam. Bamfield*, and others, have curiously solv'd this Question; but Room will not admit their Solutions at large, so that we shall conclude the Answers to this Question with the following

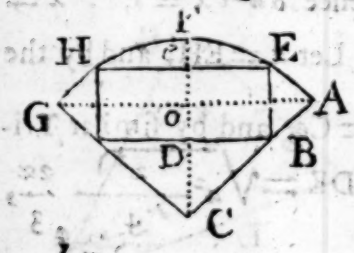
Solution by Mr. *Richard Gibbons*.

This Question was taken *verbatim* from one of your *Supplements*, as it was there proposed by Mr *John Ash*; from whence

whence it was tranſcrib'd and anſwer'd by Mr *Sam. Farrar*, in P. 38. of *Miſcell. Curioſa Math.* vol. i. where he puts m, n, and p = the Sines of the given Angles, x = the greateſt Side of the triangular Baſe, and s = 100, the whole Surface. And from thence very plainly brings $x\sqrt{\frac{sp}{3nm}}$; wch in Numbers is 6.8731 ∴ Area of the Baſe $\frac{mnx^2}{2p}$ = 16.6666 &c. Height of the Priſm $\frac{sp-mnx^2}{mx+nx+px}$ = 3.14512, and the Solidity = $\frac{mnx\times sp-mnx^2}{2p\times m+n+p}$ = 59,0854 Feet, and not $\frac{nm\times apx+nmx^2}{2p^2+2mp+2p}$ as it is there inſerted by Miſtake.

N. B. Several other of our Correſpondents juſtly obſerve that ſuch weak Practices (*viz.* tranſcribing Queſtions from other Authors) ought to be expoſed.

(5) Queſt. 125 anſwer'd by *Tabularius*.



Let CA = CF = 15 = a; and from the Solidity of the Sector we get Co = 12 = b, Ao = 9 = c; and put the Radius of the Cylinder's Baſe = BD = Ee = x; then by the Property of the Circle $Ce = \sqrt{a^2-x^2} - \frac{bx}{c}$; and putting 3,1416 = m, the Solidity of the Cylinder = $mx^2\times\sqrt{a^2-x^2} - \frac{bx}{c}$ ∴ $x^2\sqrt{a^2-x^2} - \frac{bx^3}{c}$ is a *Max.* in Fluxions $\frac{2a^2x\dot{x}-3x^3\dot{x}}{\sqrt{a^2-x^2}} - \frac{3bx^2\dot{x}}{c} = 0$ ∴ $\dot{x}\times 2a^2-3x^2 = 3bx\sqrt{a^2-x^2}$, whence by Involution and Reduction $x^4 - b^2 + \frac{4r^2}{3}\times x^2 + \frac{4a^2c^2}{9} = 0$, where $3b^2+4c^2 = 3a^2+c^2$, and $x = \frac{3a^2+c^2-b\sqrt{9a^2-c^2}}{6}^{\frac{1}{2}}$ = 6,1496, &c. hence De = 5,482, &c.

The ſame anſwer'd by Mr. *John Wiggleſworth*.

Put the Rad. AC = CF = 15 = r, 1423,92 = s, 0,5236 = p, oF = v, and DB = oE = x = half the Diameter of the greateſt inſcribed Cylinder, then the Solidity of the Sector CGFAC = $4pr^2v = s$; therefore $v = \frac{s}{4pr^2}$ = 3, and Co =

$= y = 12$ which call a, likewise $Go = Ao = \sqrt{x^2 - a^2} = 9$, which let $= b$; then by similar Triangles $b : a :: x : \frac{ax}{b} = CD$, and (by 47 E. 1.) $\sqrt{r^2 - x^2} = Ce$, therefore $\sqrt{r^2 - x^2} - \frac{ax}{b} = De$ the Length of the Cylinder, whence $3,1416x^2 \times \sqrt{r^2 - x^2} - \frac{ax}{b}$ a *Maximum*, in Fluxions $\frac{2r^2x\dot{x} - 3x^3\dot{x}}{\sqrt{r^2 - x^2}} - \frac{3ax^2\dot{x}}{b} = 0$, and by Reduction $x^4 - 252x^2 = -8100$; Solv'd $x = 6,14966$; hence the Length $= 5,48188$, and Solidity $= 651,3032$.

The same answer'd by Mr *Wm Kingstone*.

Put $x = oF$, $a = CF = 15$, $2c = ,5236$, $3e = ,7854$, $s = 1413,72$; then $12acx^2 - 4cx^3 =$ the Solidity of the Segment of the Globe AGF; and $8a^2cx - 12acx^2 + 4cx^3 =$ the Solidity of the Cone CAG; hence $8a^2cx = s$, $\therefore x = \frac{s}{8a^2c} = 3$, $Ao = 9$, and $Co = 12$. Let $z = EH$, and by the Property of the Curve $\sqrt{a^2 - \frac{z^2}{4}} = Ce$, and by similar Triangles $18 : 12 :: z : \frac{2z}{3} = CD$, and $DE = \sqrt{a^2 - \frac{z^2}{4}} - \frac{2z}{3}$, $3e \times z^2\sqrt{a^2 - \frac{z^2}{4}} - \frac{2z^3}{3} =$ the Solidity of the Cylinder, a *Maximum*, and in Fluxions is $\frac{8a^2z\dot{z} - 3z^3\dot{z}}{2\sqrt{4a^2 - z^2}} - 2z^2\dot{z} = 0$, $\therefore 8a^2 - 3z^2 = 4z\sqrt{4a^2 - z^2}$ $\therefore 64a^4 - 48a^2z^2 + 9z^4 = 64a^2z^2 - 16z^4$ $\therefore 25z^4 - 112a^2z^2 = -64a^4$, and $z^4 - \frac{112a^2z^2}{25} = \frac{-64a^4}{25}$. Solv'd $z = \frac{a\sqrt{56 + \sqrt{1530}}}{25} = 12,29664$, hence $De = 5,48428$, and the Solidity $= 651,30422$.

The same answer'd by Mr. *Sam. Bamfield*.

Put $r = 15$ Sphere's Radius, $a = ,7854$. and $x = Fo$; then $r - x = Co$; and (*per* prop. Circle) $\sqrt{2rx - x^2} = Ao = Go$; then (*per Ward's* Theor. xviii. p. 425.) $6rsx^2 - 2sx^3$ (*s* being $= ,5236$) $=$ the Solidity of the Segment AoGFA, and by having the Cones, Base and Altitude, its Solidity $= \frac{18rax - 12arxx + 4axxx}{3}$; reduced $471,24xx = 1413,72$ and hence

hence $x = 3$: For the greatest Cylinder put r = Radius, b = $Co = 12$, $c = Ao = 9$, $a = .7854$, and $x = Ee = BD$; Now by $c : b :: x : \frac{bx}{c} = DC$, and (by 47 E. 1.) $\sqrt{r^2 - x^2} = CE$ and $\sqrt{r^2 - x^2} - \frac{bx}{c} = De$ = the Cylinder's Height, which x'd by the Area of its Base $= 4axx$ gives $\sqrt{16aarrx^4 - 16aax^6} - \frac{4abx^3}{c}$ = the Solidity of the Cylinder (put $n = \frac{4ab}{c}$) then in Fluxions $\frac{22aarrx^3\dot{x} - 48a^2x^5\dot{x}}{\sqrt{16a^2r^2x^4 - 16a^2x^6}} - 3nx^2\dot{x} = 0$; hence $\frac{8ar^2 - 2ax^2}{\sqrt{r^2n^2 - x^4}} = 3n$: in Numbers $252x^2 - x^4 = 8100$; Solv'd $x = 6,1486$, the Cylinder's Diameter $= 12,2972$, and its Height 5,481933.

Solutions to this Question were received from Mr *John Nicholl*, Mr *Ben. Donn*, Mr *Geo. Godhelp*, Mr *Zach. Gaskill*, Mr *Wm Enefer*, Mr *Tho. Moss*, Mr *Robt. Butler*, and many others, as may be seen in the Catalogue.

(6) Question 126 answer'd by Mr. *Tho. Moss* the Proposer.

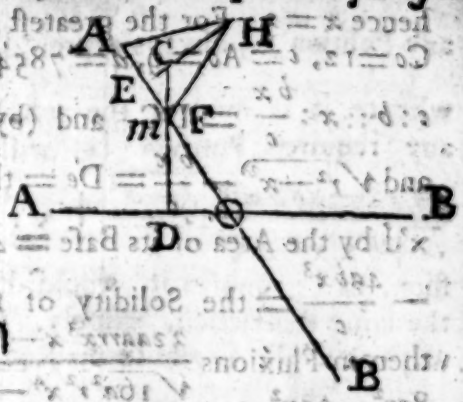
To the Authors of the Gentleman's Diary.

GENTLEMEN,

I must freely own that I did not make proper Restrictions in this Problem, which caused me to consider its Solution in a wrong Light; and indeed the Question, as it now stands, is a very ambiguous one. For it is evident, that the Rod may be made to revolve by a Force or Power acting at the Extremity thereof perpendicular to the Horizon; or it may be sustained in any Position by a Force apply'd perpendicular to the Rod, in that Position; or the Power or Force might be required to be applied with any given Angle to the Rod in the required Position; all which requires a different Solution. However, it appears to me, That the Question, as it now stands, will be consider'd in this Circumstance; that is To determine the Position of the Rod when the Weight it sustains or the Pressure upon it, caus'd by a Force always acting at Right Angles to it; is to That it sustains in an horizontal Position as 3 to 4. Therefore the following Solution is upon that Supposition.

The Centre of Gravity of the Cone AFH is known to be 12 Inches from the Vertex: Let AOB be the Horizontal Position of the Rod, and AOB the required Position thereof acting upon a Pin at the Centre O; Let fall the Perpendicular CD;

CD; put EO = EO = a, AO = $2A = b$, EC = $4 = c$, and the Sine of the required Angle of Incidence EmC = x: moreover let the Weight of the given Cone be denoted by Unity: Then (*per* Trig.) as x : $d :: \sqrt{1-x^2}$ (Sine ∠ DOm Rad. being = 1) $\div \frac{d\sqrt{1-x^2}}{x}$ = Em $\therefore a - \frac{d\sqrt{1-x^2}}{x}$ = Om; whence by the Laws of Mechanics $1 \times x$ (or x) is the Preſſure of the Cone acting on the Point m in the Direction CE: Therefore the Force that muſt be applied at the Extremity B in a Direction perpendicular to AFOB, to ſuſtain the Rod in the Poſition AOA, will be truly expreſs'd by $\frac{ax^2 - dx\sqrt{1-x^2}}{bx}$, or $\frac{ax + d\sqrt{1-x^2}}{b}$: Conſequently the whole Preſſure upon the Rod in a Direction at right Angles to it will be $\frac{bx + ax - d\sqrt{1-x^2}}{b}$: Moreover the Force or Preſſure of the Cone on the Rod, in the Direction AmOB, is defined by $1 \times \sqrt{1-x^2}$, or $\sqrt{1-x^2}$: whence the whole Preſſure the Rod ſuſtains in the requir'd Poſition will be truly expreſſed by $\frac{bx + ax - d\sqrt{1-x^2} + b\sqrt{1-x^2}}{b}$; by the Queſtion 3 : 4 :: the laſt Expreſſion : 2 (the Preſſure on the Rod in an Horizontal Poſition, which is the ſame as the Preſſure upon the Pin when the Weights are equal, and alſo at equal Diſtances from the Centre of Motion): Whence $\overline{4b+4a} \times x - \overline{4a+4b} \times \sqrt{1-x^2} = 6b$, from whence x may be determin'd.

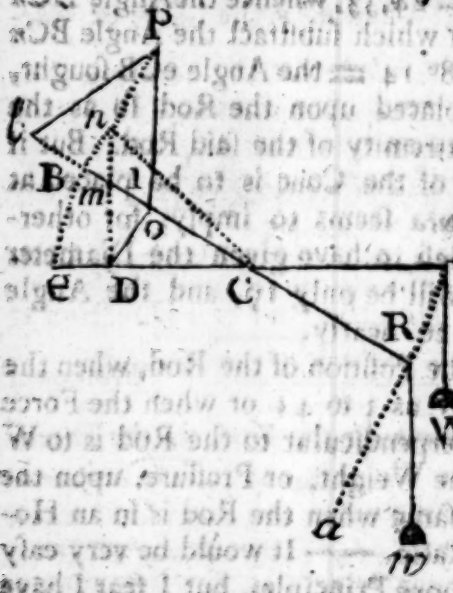


N. B. It is manifeſt that if the Rod was made to revolve by a conſtant Power or Force, or (which is the ſame thing) by a Weight ſuſpended at the Extremity of the Rod; in that Circumſtance the Pin would always ſuſtain the Sum of the Weights (that is the Cone and the ſuſpended Weight:) but on the contrary if the Force be applied always at Right Angles to the Rod, as it revolves it muſt conſequently become variable; and therefore will be in a Direction at Right Angles to the Rod, in

any

any Position (x) always expres'd by $\frac{4bnx - 4dbx\sqrt{1-x^2}}{a+bx-d\sqrt{1-x^2}}$; whence it is evident the whole Pressure upon the Pin in any required Position (x) will be accurately expres'd by $\frac{4bnx - 4dbx\sqrt{1-x^2}}{a+bx-d\sqrt{1-x^2}} + \sqrt{1-x^2}$; Consequently the Question, as I proposed it, would have been fairly limited under the same Restriction, namely, The Force to have acted always at Right Angles to the Rod as the said Rod revolved.

The same answer'd by Mr. *Tho. Garrard*.



Let eA represent the Rod in an horizontal Position, BR the same in the required Position, C its Point of Suspension, PIB the given Cone, and n its Centre of Gravity (where $Bn = \frac{1}{4}$ of BP); also let nD and Da be perpendicular to eC and CB respectively. Now if CB = Ce represent the Weight W acting at the Point A sufficient to keep the Rod and Cone in Horizontal Position Ae, then will (by the Laws of Mechanics, if I mistake not) Cm represent the Weight w acting the same Direction as W, *viz.* perpendicular to the Horizon) and sufficient to retain the Rod in the Position BR, and CD will be the said Force acting at the Point R in the Direction Ra, perpendicular to RB. Lastly Co will be the Pressure that the said Force CD acting as aforesaid will have upon the Point of Suspension C in a Direction perpendicular to the Horizon. Whence I think we may draw the following

Inferences. First, That 2Cm will be the Weight or Pressure upon the Point of Suspension C, supposing the Rod to be kept in the Position BR by a Weight as w acting in a Direction perpendicular to the Horizon.

2dly, 2CD will be the Weight sustain'd by the Rod in a Direction perpendicular thereunto.

3dly,

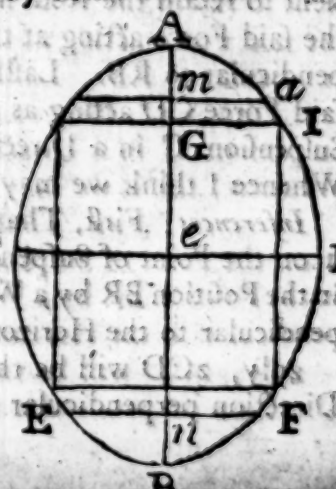
3dly, CB + Ce will be the Weight or Preſſure upon the Point C, ſuppoſing the Rod retain'd in the Poſition RB by a Force acting at R, only in the Direction Re perpendicular to the Rod, ſo that if the *Propoſer's* Meaning was to find the Poſition of the Rod when it ſuſtains a Weight, in a Direction perpendicular thereunto, which alone tends to break the Rod = ⅔ of what it ſuſtains when in the Horizontal Poſition eA, or when DC = ⅔ of BC. We have a very good Method of

Solution. In the Right angled Triangle BnC are known BC = 24 and Bn = 4, Whence nC = 24,33 and Angle BCn = 9° 28′: Then in the Right angled Triangle nDC are known DC = ⅔ths of eC = 18, and nC = 24,33, whence the Angle DCn will be found = 47° 42′, from which ſubſtract the Angle BCn = 9° 28′, the Remainder = 38° 14′ = the Angle eCB ſought, ſuppoſing the Cone is to be placed upon the Rod ſo as the Centre of its Baſe be at the Extremity of the ſaid Rod. But if the outward Edge of the Baſe of the Cone is to be placed at the End of the Rod (as the *Data* ſeems to imply, for otherwiſe it would have been needleſs to have given the Diameter of the Cone's Baſe) then BC will be only 19, and the Angle eCB will be found about 35° 20′ nearly.

If it was required to find the Poſition of the Rod, when the Weight *w* is to the Weight W as 3 to 4; or when the Force applied at R in a Direction perpendicular to the Rod is to W in the ſaid Ratio, or when the Weight, or Preſſure, upon the Point of Suſpenſion is to the ſame when the Rod is in an Horizontal Poſition in the ſaid Ratio. —— It would be very eaſy to give Solutions upon the above Principles, but I fear I have already been too prolix.

(7) Queſtion 127 anſwered by Mr. *Wm Bevil.*

Let 2*a* = EF = 32 Inches the Head Diam. 2*b* = CD = 40, the Bung Diameter, *f* = ,7854, *h* = 231, *k* = 282, and for the Length of the Caſk put 2*x* = *mn*, alſo *y* = *Am*, then *per* Conics $y^2 : b^2 :: b^2 - x^2 : \frac{b^2}{a^2} \times a^2 - x^2 = a^2$, $\therefore y^2 = \frac{b^2 x^2}{b^2 - a^2}$ if $q^2 = b^2 - a^2$, then $y = \frac{bx}{q}$, for which put *s*, and let *v* = G*e* = ½ the Length of the Cylinder,



C therefore

therefore $s+v=BG$, and $s-v=AG$, $s^2:b^2::s^2-v^2:\frac{b^2}{s^2}\times s^2-v^2=IG^2:\frac{4b^2f}{s^2}\times 2s^2v-2v^3=$ the Content of the Cylinder a Maximum and in Fluxions $s^2\dot{v}-3v^2\dot{x}=0$, $v=s\sqrt{\frac{1}{3}}$, or $v=\frac{bx}{q}\sqrt{\frac{1}{3}}$: Now if the Value of v, and s be substituted in the Equation above, we get $b\sqrt{\frac{2}{3}}$ for half Diam. of the Cylinder: Therefore $\frac{16b^3fx\sqrt{\frac{1}{3}}}{3qk}=$ the Content.

Again for the Solidity of the greatest Cube it is evident that $2v=\frac{2b\sqrt{2}}{s}\sqrt{s^2-v^2}$; whence $2v=\sqrt{\frac{8b^2s^2}{2b^2+s^2}}$, but if the Value of s be substituted, then $2v=\sqrt{\frac{8b^2x^2}{2q^2+x^2}}=$ the Side of the Cube, and its Content $=\sqrt{\frac{8b^2x^2}{2q^2+x^2}}^{\frac{3}{2}}\div b$ (then *per* Question) $\sqrt{\frac{8b^2x^2}{2q^2+x^2}}^{\frac{3}{2}}\div b:\frac{16b^3fx\sqrt{\frac{1}{3}}}{3qk}::1:1\frac{3}{5}\frac{2}{0}$, $\therefore\sqrt{\frac{8b^2x^2}{2q^2+x^2}}^{\frac{3}{2}}\div\frac{8gh}{50}=\frac{16b^3fx\sqrt{\frac{1}{3}}}{3qk}$ which is an Equation of the 6th Power, whence x will be found 26,295; hence the Cask's Length $=52,59$.

The same answer'd by Mr. *Sam. Bamfield.*

Put $b=\frac{1}{2}$ Conjugate Diam. $=20$. $c=231$ Inches in a Wine Gallon, $e=,7854$, $r=282$, the Inches in an Ale Gallon, $p=1,78=1\frac{3}{5}\frac{2}{0}$, $x=\frac{1}{2}$ Transverse Diam. Then since $\frac{x}{\sqrt{3}}(=,57735x=nx)$ is well known to be universally $=\frac{1}{2}$ the Length of the greatest Cylinder that can be inscribed in the whole Spheroid, it follows that $x-nx=mA$, and $x+nx=Bm$; now say *per* Ellipsis $x^2:b^2::x^2-n^2x^2:b^2-b^2n^2=ma^2=266.666$. Hence $ma=16,32993=\frac{1}{2}$ Cylinder's Diam.: for its Double put d, then $\frac{2d^2nex}{r}=$ the Content of the Cylinder in Ale Gallons *per* Queſt. say $p:1::\frac{2d^2enx}{r}:\frac{2d^2enx}{pr}=$ the Cont^t of the Cube in Wine Gallons: Therefore $\frac{2cddenx}{rp}=445,1758\&c=sx=$ Cube in Inches $\therefore\sqrt{sx}^{\frac{1}{3}}=$ Cube's Side, and $\sqrt[3]{\frac{sx}{2}}$

$= \frac{1}{2}$ half Side $= Ge$; then $x - \sqrt[3]{\frac{sx}{2}} = GA$, and $x + \sqrt[3]{\frac{sx}{2}}$ $= BG$; and (*per* Prop. Ellipsis) $x^2 : b^2 :: x^2 - ,25\sqrt[3]{s^2x^2} : \frac{x^2b^2 - ,25b^2\sqrt[3]{s^2x^2}}{x^2} = GI^2 =$ Square of $\frac{1}{2}$ the Diam. of this Cask at that Place: whence the Side of its corresponding inscribed Square $= \sqrt{2b^2 - \frac{5bb\sqrt[3]{s^2x^2}}{xx}} = \sqrt[3]{\frac{sx}{2}} =$ Cube's Side before found; which Equation squared gives $\sqrt[3]{s^2x^2} = 2bb - \frac{5bb\sqrt[3]{s^2x^2}}{xx}$; for x^2 put y^3, and for s^2 put g^3; then $gy = 2b^2 - \frac{,5b^2gy}{y^3} \therefore gy^4 = 2bby^3 - ,5bbgy$ or $gy^3 = 2bby^2 - ,5bbg$, in Numbers $14.5756 = y^2 - ,0728788y^3$; Solv'd $y = 12.425$; from whence x is found $= 43.828$; Hence having the Transverse $= 87,656$, the Conjugate $= 40$, and the Head Diam. $= 32$, the Length of the Vessel $= 52,5936$, the Cylinder's Length $= 50,6082$, and the Content of the Cask $= 206,24366$ Ale Gallons, or $251,77406$ Wine Gallons.

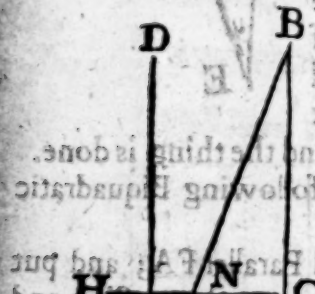
The same answer'd by Mr. *J. Wigglesworth.*

Let AB $= 2s$, DE $= 40 = 2c$, KL $= 32 = 2a$, $m = 359,05$, $n = 231$, $p = 1\frac{19}{20}$, $2z =$ RS, and $2x =$ HI; the Diagonal of the inscribed Cube; then $x\sqrt{2}$ $= \frac{1}{3}$ half the Length of the Cube $=$ PC; and because the greatest Cylinder that can be inscribed in the Cask is also the greatest that can be inscribed in the Spheroid, we have *per* Fluxions $2c\sqrt{\frac{1}{3}} =$ Diam. of the greatest inscribed Cylinder $=$ FG, which call b, and $2s\sqrt{\frac{1}{3}} =$ the Length $=$ MN; whence $\frac{2sb^2\sqrt{\frac{1}{3}}}{m} =$ Content of the Cylinder in Ale Gallons, and $\frac{2x^3\sqrt{2}}{n}$ $=$ the Content of the Cube in Wine Gallons: Then (*per* Qu.)

$r : p :: \frac{2x^3\sqrt{2}}{n} : \frac{2px^3\sqrt{2}}{nb^2\sqrt{\frac{1}{2}}} = \frac{2tb^2\sqrt{\frac{1}{2}}}{m}$ therefore $t = \frac{pmx^3\sqrt{2}}{nb^2\sqrt{\frac{1}{2}}}$ and by the Nature of the Ellipsis $t^2 : c^2 :: t + \frac{x\sqrt{2}}{2} \times t - \frac{x\sqrt{2}}{2} : x^2$, whence by multiplying Extreams and Means $t^2x^2 = t^2c^2 - \frac{c^2x^2}{2}$, and $t = \frac{rx}{\sqrt{2c^2 - 2x^2}}$, then from these two Values of t we have $\frac{pmx^3\sqrt{2}}{nb^2\sqrt{\frac{1}{2}}} = \frac{c}{\sqrt{2c^2 - 2x^2}}$ Reduc'd $x^6 - c^2x^4 = \frac{-n^2b^4c^2}{12m^2p^2}$ where $x = 19,03269$; hence $t = 43,80125$, and thence $t : c^2 :: t^2 - z^2 : a^2$; therefore $t^2a^2 = t^2c^2 - c^2z^2$, and $z = \frac{t}{c} \times \sqrt{c^2 - a^2} = 26,28075 =$ half the Length of the Cask; whence the Content $\left\{\begin{matrix} 206,1178 \text{ Ale} \\ 251,6204 \text{ Wine} \end{matrix}\right\}$ Gallons.

Mr *John Nichols*, Mr *Ben. Donn*, Mr *J. Watchorne*, Mr *Tho. Moss*, *Harland Widd*, Mr *Wm Kingstone*, Mr *Wm Cottam*, Mr *Llewellin Davies*, and many others, have solved this Question, but we have been too prolix already.

(8) Question 128 answer'd by Mr. *Wm Cottam*.



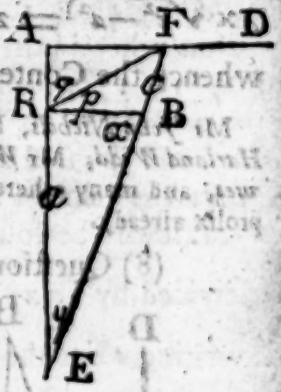
Draw the indefinite Line BR South and North, set off the given Distance between *Edystone* and *Ramhead* from B to C; and at C draw the indefinite Perpendicular CH; next make the Angle LCR = the given Position of *Ramhead* from *Plymouth Fort* = S.W. by W. = 56° 15′, then with the given Extent in your Compasses AN of the Distance of the Ship from the Fort when they saw the Flash = 17130 Feet = 1,08143 Leagues by a Pin as a Centre at B; turn the Scale and Compasses back together from C towards H, with one Foot in the Line CH, till the other Foot falls in the Line CL as at A; draw the Line BNA and it is done. Then will A represent *Plymouth Fort*, C *Ramhead*, B *Edystone*, and N the Place of the Ship when they saw the Flash.

Demonstration. Draw DA parallel to BR, and because the Line LC cuts those Parallels, the Angle DAC = Angle LCR, the given Position of C (*Ramhead*) from A (*Plymouth Fort.*) and for the same Reason the Angle ABC = Angle BAD, the requir'd Position of *Edystone* (B) from *Plymouth Fort* (A).

Inveſtigation. Let BC = 3 Leagues = c, AN = 1,08143 = b, the Sine of the Angle LCR = 56° 15′ = n, its Coſ. = r, the Sine of the Angle ABC = x, and Rad. = 1: Then $\sqrt{1-x^2} : c :: 1 : \frac{c}{\sqrt{1-x^2}} = BN$, and $n : \frac{c}{\sqrt{1-x^2}} + b :: r : \frac{cx}{n\sqrt{1-x^2}} + \frac{ax}{n} = AC$; and $r : a :: \sqrt{1-x^2} : \frac{a}{r}\sqrt{1-x^2} = AC$: $\therefore \frac{a}{r}\sqrt{1-x^2} = \frac{cx}{n\sqrt{1-x^2}} + \frac{ax}{n}$; whence $x =$ 0,35314 = Sine 20° 40′ 40″ = the Poſition of *Edyſtone*; and by Trig. we get AB = 4,28799, and AC = 1,82104 Leagues.

The ſame anſwer'd by Mr. *Rich. Gibbons*, the Propoſer.

Conſtruction. Draw the Meridian Line EA, and lay down ER = 9 Miles; Draw RF to make an Angle with the Meridian at R = 5 Points; alſo the Parallel RB (draw them both long enough) Then take the given Diſtance FB = 17130 Feet = 3,24432 Miles; then with a Pair of Compaſſes, and keeping one Edge of the Scale conſtantly on E, apply both Points of the Compaſſes cloſe to the ſame Edge till one ſtand on RB, and the other on RF; fix the Scale and draw the Right Line EBF, and the thing is done.



THIS eaſy Conſtruction clears the following Biquadratic Equation.

Solution. Join the Meridian RA, and Parallel FA; and put d = ER = 9 Miles, b = FB = 3,24432; s and c = Sine and Coſine of five Points; and x = RA: Then as $x : b :: d : \frac{bd}{x}$ = EB, and $c : x :: s : \frac{sx}{c}$ = AF: From hence (and 47 E. 1.) we have $d^2 + 2dx + x^2 + \frac{s^2x^2}{c^2} = \frac{b^2d^2 + 2b^2dx + b^2x^2}{x^2}$ $\therefore x^4 + 2c^2dx^3 + c^2d^2x^2 \left.\begin{matrix}\\\\\end{matrix}\right\} - 2b^2c^2dx = b^2c^2d^2$. $\left.\begin{matrix}\\\\\end{matrix}\right\} - c^2b^2x^2$

Solv'd x = 3,03353, from whence is had by common Trig. the Bearing and Diſtance of *Edyſtone* S. 20° 40′ 45″ W. 12,8641, and *Rumhead* = 5,4634 Miles from the Fort.

The ſame anſwer'd by Mr. *Tho. Garrard*.

Conſtruction. Make ER = 9 Miles or 47520 Feet; RA = 11 48 × 15 = 17130, RB perp. to AE, and the < BRF = 3 Points

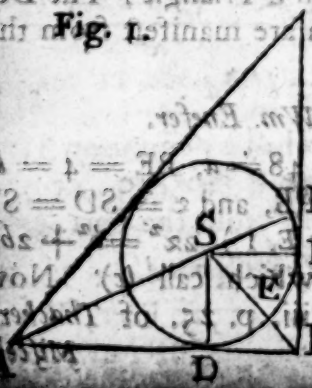
or 33° 45′; thro' A draw the Conchoid AFD: Lastly thro' E, and Point of Intersection F draw EF, so shall the Scheme be truly constructed; Or if by any mechanical Method the Line FB = AR be inscribed between the Lines RB and RF so as when continued it may pass through E, the same will be effected, where F represents *Plymouth Fort*, R *Ramhead*, E *Edystone*, and B the Boat.

Calculation. Let the Sides and Sines of the several Angles be denoted as *per* Fig. Then by plain Trig. $: x \; a :: 1 : \frac{a}{x} =$ BE, and $p : c :: x : \frac{cx}{p} =$ RF; again $y : \frac{cx}{p} :: q : \frac{cqx}{py} =$ FE $= \frac{a}{x} + c$, $\therefore cqxx = pcxy + pay$; which Equation being clear'd, by 47 E. 1. will produce an adfected Biquadratic Equation wherein the Root x will be found = the natural Sine of 69° 19′ 17″; consequently the Bearing of *Edystone* from the Fort or Boat = 20° 40′ 43″, Distance from the Boat 9,6197 Miles, and the Distance of *Ramhead* from the Fort was 5,473.

But the Value of x in the above Equation may much more expeditiously be found thus: Let each Side of the Equation be divided by $cqxy$, then will it stand thus, $\frac{x}{y} - \frac{pa}{qcx} = \frac{p}{q}$ or writing t for the Tangent and v for the Cosecant of the Arch of which x is the Sine, we have $t - \frac{pav}{qc} = \frac{p}{q}$; now seeing the Angle will be nearly known by the above Construction, the same may be corrected by the help of a Table of Natural Tangents and Secants, and the Method of Trials and Errors so often mentioned in the *Diary*.

This Question was curiously solv'd by Mr *John Nichols*, Mr *Benj. Donn*, Mr *Stepb. Hartley*, Mr *Zach. Gaskill*, Mr *J. Watcborne*, Mr *Tbo. Moss*, Mr *Wm Kingstone*, *Harland Widd*, Mr *Sam. Bamfield*, and others.

Fig. 1.



(9) Question 129 answer'd by Mr. *Benj. Donn*.

Let x = Rad. Circle = SE = SD = DB *&c.* a = EB = 4; then $a + x$ = SB $\therefore a^2 + 2ax + x^2 = 2x^2 \therefore x = a + a\sqrt{2}$. Then by *Thacker's* 13th Probl. AB and ∠BAS will be known. Consequently in the Right angled Triangle will be given B A and ∠CAB to find AC and BC.

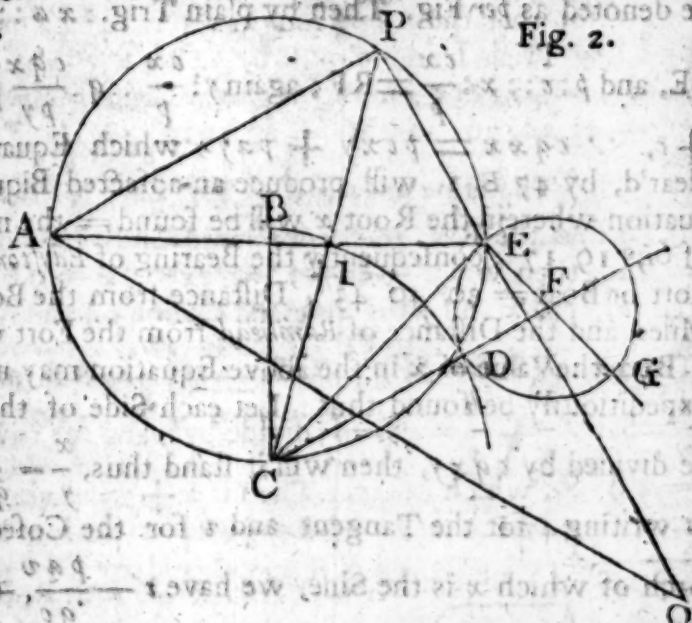
The

The same answer'd by Mr. *Tho. Moss.*

It is evident, from the Nature of the Problem that the Radius of the inscribed Circle is given; whence the said Problem is reduced to this, *viz.* Having the Base (*i.e.* the given bisecting Line) the Vertical Angle (a right one) and the Line that bisects the Vertical Angle, and terminates at the Base, (the given Radius *plus* the given Distance from the Right Angle to the Periphery of the inscribed Circle) to determine the Triangle.

Construction. With the Radius AB = EB = ½ the given bisecting Line describe a Circle (See *Simpson's Algebra*, pag. 382.) draw BC perpendicular to AE, join CE; make EF perp. to CE, and = to half the given Line that bisects the Right Angle; join CF, and upon F as a Centre with the Radius EF describe the Circle EDG: Likewise from C with the Interval CD describe the Arch DI cutting AE in I; from C thro' I draw CIP; join AP, and PE; and APE will be the required Triangle.— Moreover produce PE, and make the ∠EAQ = ∠EAP; and APQ will be the requir'd Triangle: The Demonstration and Calculation of which are manifest from the above mentioned Quotation.

Fig. 2.



The same answer'd by Mr. *Wm. Enefer.*

Put AH (see Fig. 1. foregoing) = 48 = *a*, BE = 4 = *b*, also let *x* and *y* = Sine and Cos. ∠HAB, and *z* = SD = SF = BE; then *x* + *b* = SB, and (by 47 *E.* 1.) $2x^2 = b^2 + 2bz + z^2$; $x = b\sqrt{2} + b = 9.65684$, which call (*c*). Now we have the same Data as in Prob. xiii. p. 25. of *Thacker's*

Miscell. Consequently the Quest. might be now solved by the same Method; but for Variety's sake I shall proceed thus; 1 (Rad.) : a : : y : ay = AB; again x : c : : y : $\frac{cy}{x}$ = AD; $\frac{cy+cx}{x}$ = AB = ay; Then $cy+cx = axy$, and $y+x = \frac{a}{c}xy$, divide by xy and it becomes $\frac{1}{x}+\frac{1}{y} = \frac{a}{c}$ = 4,97057, that is the Natural *plus* the Natural Cosecant of the Angle HAB = 4,97057; whence by a Table of Natural Secants I find by Inspection that the Angle sought for is 14° 42′ nearly; then by a few Trials I find it must be 14° 42′ 56″½. Hence AB ($= ay$) = 46,4255 and the Angles are known; whence I find AC = 53,30476, and BC = 26,1929. *W. W. F.*

The same answer'd by Mr. *Zach Gaskill.*

To find the Rad. of the inscribed Circle (SD or SF) put z = Rad. then will $z^2+8z+16 = 2z^2$ ∴ z = 9,6568, which call (b), call x and y the Sine and Cosine of the Angle HAB; Then x : b (SD = SF) : : Rad. = 1 : $\frac{b}{x}$ = AS, and y 1 b : : : $\frac{b}{y}$ = SH ∴ $\frac{b}{x}+\frac{b}{y}$ = 48 = d; divide by b, and we have $\frac{1}{x}+\frac{1}{y}$ = 4,9706, which call (c); Then is $x+y = cxy$. But x^2+y^2 = 1 (*per* 47 *E.* 1.) ∴ $x^2+2xy+y^2 = 1+2xy$, and $x+y = (1+2xy)^{\frac{1}{2}}$, and consequently $cxy = \sqrt{1+2xy}$: Reduced $xy = \sqrt{\frac{1}{c^2}+\frac{1}{c^4}}+\frac{1}{c^2}$ = ,245690. The Sum of the Sine and Cosine being fitted to correspond with the Logarithm of that Number are 14° 43′ 22″, and 75° 16′ 38″, whence the rest may be found.

N. B. This Question was propos'd some Years since by Mr *Tho. Bird*, in the *Ladies Diary*; but as Tabular References are Useful and Allowable in the Conclusion especially relating to Angles, I humbly presume the above is as easy and simple as if it was thrown into a Tangent.

This Question was answer'd by Mr *John Nichols*, Mr *John Hudson*, Mr *Rich. Mallock*, Mr *J. Watchorne*, Mr *Jo. Scott*, Mr *John Wigglesworth*, Mr *Wm Kingstone*, Mr *Matt. Ward*, Mr *John Woolley*, Mr *Tho. Walker*, Mr *Wm Smith*, and others, as may be seen in the Catalogue.

(10) Quest. 130. answer'd by Mr. *Wm Enefer.*

Put a = 1000, n = 20, R = 1,05, and A the required Annuity, then by common Rules; A =

$A = \frac{\sqrt{R^2 - \frac{1}{4}pq}}{1 - R^n} = 80,242576, = 80\,l.\ 4\,s.\ 10\,d.\ \frac{1}{4}$ nearly.

We receiv'd many Solutions to this Question, but as they all agree, and are pretty much alike, we shall insert no more of them, but refer you to the Catalogue.

Errata, Emendations, and Remarks.

Errata.

In Mr *Wm Kingstone's* Solution to Probl. 108. AB should be $= \frac{b}{2587853}$. BD $= 1133599$; whence $\frac{b}{a} = 3705118 =$ Sine 44° 59' 20", and the requir'd Angle 21° 8' 34".

In Mr *Garrard's* Solution to Problem 118. *Diary* 1753. pag. 36. Lines 27 and 28. *instead of* PCE = BCR = 44° 52' 47", *Read* PCE = 44° 52' 47", whose Complement is the Angle BCR; *And instead of* RCN = 69° 07' 20", *Read* 68° 52' 54".

Remarks by Mr. *Tho. Moss.*

1st, I was very much surpriz'd when I saw Mr *Kingston's* pretended Construction to the 116th Question. I think I may be bold to say, you did not receive one Geom. Construction to that Question. I am greatly at a Loss to know how that can be call'd a Solution, when there is no Mention made of the Perimeter; and without that the Question, it is plain, is unlimited: For by the same Method we might give as many Solutions as it is possible to take two Lines in the given Ratio of the Lines bisecting the Base, and the vertical Angle: Therefore it is evident that the Triangle ABC can neither be the requir'd Triangle, nor one similar to it: and we might with equal Propriety say, that by having the Base and Perpendicular of any Plain Triangle (the Right-angled one only excepted) we can determine the Triangle.

2d, Page 33. Line 7. from the Fig. *instead of* IF and BH, IC and BD, AB and FD; *Read* IF, BH, IC, BD; AB and FD.

3d, Page 34. in Mr *Bevil's* Solution, instead of $bx^2 x^4 + a^2x^2 = b^4$ *Read* $b^2x^4 + a^2x6 = b^4$.

Errata for the last Year's Diary.

In the second Line of the 4th Ænigma, *for* But as the Darkness, *Read* But at the Instant Darkness

And after the 7th Line, in the 6th Ænigma, *Read this Line, which was entirely omitted,*

Could ever reach with all its Learned Store.

Answers to the Ænigma's in last Year's Diary.

1. Happiness.	3. Love.	5. Tea.
2. A Louse.	4. A Blank.	6. Lethe.

New

New MATHEMATICAL QUESTIONS, *to be answer'd in the next Year's* Diary.

(1) Question 131 by Mr. *Alex. Rowe.*

A Water Mill is to be built, where the Current of the Water has a Fall of 22 Feet, or perpendicular Descent; the Architect desires to know the Diameter of the Water Wheel so that the Power or Force it shall receive from the issuing Water may be the greatest possible?

(2) Question 132 by *Tabularius.*

Suppose a right angled Triangle to revolve about its Perpendicular ($a = 10$ Feet); the Solidity of the generating Cone will be equal to the Perimeter of the Triangle, drawn into the Area of a Circle described by its Centre of Gravity, in the said Revolution; Required the Base of the Triangle?

(3) Question 133 by Mr. *Paul Sharp.*

Requir'd the Perimeter of the least common Parabola that will circumscribe a Circle whose Diameter is 32 Inches?

(4) Question 134 by Mr. *J. Wigglesworth.*

The Fences of a Piece of Land are the Abscissa, Ordinate, and Curve of the Conic Parabola. Now there is given the Perimeter or Sum of the three Sides = 80 Chains; and the Ordinate is to the Abscissa as 6 to 5: Requir'd the Area by a simple Equation?

(5) Question 135 by Mr. *J. Wigglesworth.*

Requir'd to find (x) and (y) in the following Equations? $\begin{cases} x^3y+y^3x+x^2-xy=76864 \\ 4x^2-4y^2+x+y^4=615104. \end{cases}$

(6) Question 136 by Mr. *Tho. Moss.*

To determine the Figure of a Vessel, which being fill'd with Water, or any other Liquor, the Surface thereof shall descend uniformly, by evacuating at a Hole in the Bottom (or Vertex) of the said Vessel. And the Content, in Ale Gallons, when its top Diameter is just 20 Inches?

(7) Question 137 by Mr. *John Thompson.*

A Gentleman bought a Field in the Form of a right angled Triangle, the Sum of whose Sides is 60 Chains at the following Rate, *viz.* for every Chain of the Perpendicular he was to pay two Guineas, and for each Chain of the Base one Guinea:

Quære

Quære the Sides of the Field when the Gentleman has the most Land in proportion to his Money?

(8) Question 138 by Mr. *Richard Gibbons.*

Given the Area of the Segment of a Circle = 3 Feet, and that of its circumscribing Parallelogram = 4 Feet; *Quære* the Circle's Diameter?

(9) Question 139 by Mr. *J. Holden.*

At what Time of the Year 1753 was the Night (exclusive of Twilight) longer at *York*, than it was either at *London* or *Edinburgh*?

(10) Question 140 by Mr. *Sam. Bamfield.*

What was the Time in the Afternoon at *London* on the longest Day 1752 when an Object making an Angle with the Horizon of 54° did cast its Shadow due West? Also what Angle must the Object or Gnomon make with the Meridian?

New Ænigmas to be answer'd in next Year's *Diary.*

(1) Ænigma 89. by Mr. *Sam. Hammond*, of *Nottingham.*

I First impos'd on *Mother* Eve,
And still continue to deceive;
To which I am by Nature prone,
But fail in the Attempt if known:
For, as I act in deep Disguise,
My Power in Delusion lies;
Being ever just the Contrary
Of That which I pretend to be:
Yet (seemingly) I reconcile
Real Contradictions; and beguile
Weak *Mortals* so, as (in a Trice)
To think *Vice Virtue, Virtue Vice.*
I hide more *Faults* than *Love*, yet *Hate*
Doth not so many *Faults* create;
And Each I *hide*, or *strive* to *do*,
Is, by that Act, increas'd to Two.
Truth, Justice, Charity also,
Oppose *Me*; *Fear's* my Friend and Foe:
Fraud, *Flatt'ry*, *Malice*, are my Friends,
Because I often serve their Ends.
My *Subtilty*, too oft, defies
The *Penetration* of the *Wise*;
Tho' *Fools* and *Children* do reveal
What I endeavour to conceal.

(2) Ænig.

(2) Ænigma 90. by Mr. *John Dyke* of *Manningford*.

Tho' *Something* I am, yet I *Substance* have none,
Am *praiſed* or *liked* by every one;
Nay, *long'd for* by ſome: Tho' obſerve (by the bye)
The *Prude* ſays ſhe hates me; but that is a Lie.
I'm *heard* and I'm *felt*, but I never was ſeen;
Begot by young *Ralph*, on ſweet *Sue of the Green*.

(3) Ænigma 91. by Mr. *William Heaford*.

Ye *Artiſts*, who in abſtruſe Riddles deal,
To you I only for my Name appeal:
I who for many Years have noted been,
And in your Books of Record often ſeen,
Implore of you, if it may granted be,
That to the World you will diſcover Me.
Know then, in various Colours I appear,
Attend each honeſt *Patriot* ev'ry where:
Their very Thoughts and Actions are by Me
Extended to their full Maturity:
And tho' I'm ſettled in the Midſt of Store,
Am always ready to aſſiſt the Poor.
Where Honeſty abounds you'll meet with Me,
In homely Cottage, Town, or Country;
And yet, whatever you may think my Station,
I am the firſt in Office thro' the Nation:
I ſeek not Dignity, yet ſuch my Caſe,
That in the *Houſe* of LORDS I have a Place;
In each Oration there I have the Leading,
But never am concern'd in any Pleading.
In ancient Times (if *Hiſt'ry* does not lie)
The Symbol of Eternity was I;
And to the preſent Time I am ſet forth
As a Diſtinguiſher of noble Birth.
But one thing more, and then it may ſuffice,
Tho' let not my Concluſion cauſe Surprize:
Whilſt you employ your Thoughts what I may be,
For I declare there is no End of Me.

(4) Ænigma 92. by Mr. *D. Davis*, Writing Maſter, at *Burleigh*, near *Minchinhampton*, in *Glouceſterſhire*.

Tho', *Adam*-like, my Origin's from Earth,
To *Vulcan*'s Sons I chiefly owe my Birth;

But

But ſince my Form ſcarce *Euclid* could deſcry,
Excuſe Deſcription — ſearch Antiquity ——
But *far* you need not go to find my Name,
The ſacred *Records* will unfold the ſame.
When *Levi's* Sons to Worſhip did repair,
By poſitive Command I ſtill was there:
But now (degen'rate Age!) you rarely ſee
That in the *Church* I can of Service be;
Nay more (ſad Proof of Piety's Decay)
I to the *Cloſet* ſeldom find my Way.
Not ſo at *Plays*, and *Balls*, and *Maſquerade*,
(To *Britain's Honour* now a thriving Trade)
On theſe *important* Things I ſtill attend;
For *one*'s appointed always for that End.
At your *late* Suppers too, I often wait,
But ne'er ſit down, yet ſometimes catch a Bit;
Not of cold Treats, my *Food* is hot and light.
In Country *Cottages* I'm rarely ſeen,
But never fail to wait upon a QUEEN.
Take one Hint more, and then the Miſt is fled,
I *prey* upon the Living, not the Dead.

(5) Ænigma 93. by Mr. *Andrew Wheldon*.

When GOD at firſt all *Mundane* Things did frame
From *Chaos* wild: and *Adam* them did name:
When diſtant *Stars* their Motions firſt begun,
And *Planets* to move round their central *Sun*;
In *Paradiſe* I had not then a Name,
But 'fore *Man's* Exile thence I thither came.
GOD made not Me —— my *Sire*, ſome have ſaid
Did dwell in *Heaven* before this *Earth* was made.
I Mortals taught their Bodies to adorn,
Or We had Naked liv'd as we were born:
I have a *Son* —— We both were born one Day,
Tho' it was Years e'er He began his Sway:
My Mother's Son felt firſt his mighty Stroke,
And many ſince have borne his painful Yoke:
My Enemies all *wiſh* my Son to know,
For them he frees from ev'ry Pain and Woe.
But all my Votaries him Fear and Hate,
For thoſe he *deſtines* to a wretched State.
MILTON, by *Metaphors*, our Deſcent ſhews;
Ye prying Wits, my *om'nous* Name diſcloſe.

(6) Ænigma

(6) Ænigma 94. by Mr. *John Noorthouck*, of *Watford*.

Attend, ye *Riddling Puzzling* Tribe,
While I my Properties deſcribe.
Of many, various, Shapes I am,
A *Square*, or *Parallelogram*,
An *Oval*, *Circle*, *Polygon*,
Or what my Maker fixes on;
A *Priſm*, *Cylinder*, or *Cone*,
Or *Parallelopipedon*:
And as my *Shapes*, you ſee, are various,
My *Subſtance* likewiſe is precarious;
Sometimes ſo *hard* I'd brave the Axe,
Sometimes almoſt as *ſoft* as Wax;
And if you *Huſbands* are that read,
Sometimes of what *you* chiefly dread:
But yet I commonly am found
To have a *Mouth* with *Eyes* ſet round;
My Mouth I *eat* withal, no doubt,
But from my Eyes I *give it out*;
And 'tis a Secret few can tell
How to *prepare* my Diet well.
(I'm ſometimes found to have a Brother,
And we're not much unlike each other;
He has no *Mouth*, but Store of *Eyes*,
And what he eats ſo much does prize
He voids it and again he eats it;
And ev'ry Time he can repeats it)
All Kinds of Learning I command,
Yet not a *Science* underſtand:
Have many Servants to attend Me,
The *Sons* of Knowledge all befriend Me;
And, in return, I often do
Procure them Fame and Money too.
All Trades and Manufactures I
With kind Aſſiſtance do ſupply:
From what I've told, I make no Doubt
But You, with Eaſe, will find Me out.

(7) Ænigma 95. by Mr. *D. Davis*, Writing Maſter, &c.

It's ſtrange (methinks) that I'm forgot,
And no *Ænigma* on Me wrote;
When Things leſs uſeful do appear,
T'amuſe the *Publick* ev'ry Year. What

What tho' my Size is very ſmall,
I' th' Learned World I'm us'd by All;
By *Judge*, *Divine*, and *Politician*,
By *Poet-Laureat*, and *Phyſician*;
Nay, ev'ry *School-boy* knows me well,
When He the *Alphabet* can tell:
From hence you'll gueſs I muſt appear
I' th' *Criſs-Croſs-Row*; but pray forbear,
Nay be aſſur'd (ſuch is my Pride)
I o'er that Rank do ſtill preſide.
In *Politics* I have my Share,
Yet ne'er was ſeen in *Peace* nor *War*;
With *Magiſtrates* I ſtill reſort,
Tho' never ſhew'd my Head in Court.
In *Oxford*, (deem'd the *Muſes'* Seat)
I never yet a Place could get:
And tho' in LONDON don't appear,
Look o'er *Guild-Hall*, you'll find me there.
Nay more, (to add to your Surprize)
I am this Moment 'fore your Eyes!

(8) Ænigma 96. by Mr. *R. M. Nottingham.*

A Monſter dire! from Human Race I ſpring,
And Woes unnumber'd in my Train I bring:
I ravage all around the Earthly Ball,
But *Britain's* Iſle attends my greateſt Call;
My Vot'ries there with fiery Pangs I teaze,
And oft their Limbs with cruel Tortures ſeize,
In painful Bondage, Tyrant-like, confine,
And make 'em to my haughty Will reſign;
For Fury like, I'm greatly dreaded here,
And put the boldeſt Hero, into Fear;
Tho' often nought but Patience ſets 'em free,
From this my bold and cruel Tyranny.
Yet ſome there be my Pangs would joyful chuſe,
But ſtubborn Pow'r! my Thralls I them refuſe;
The Poor, good hap! do ſeldom wear my Chains,
Or bear the Rigour of my burning Pains:
The Great and Wealthy moſtly are my Slaves,
And oft I ſend 'em to their ſilent Graves;
But Thoſe that from my galling Chains get free,
With Spirits blith, ſolace their Liberty.
No more —— For thoſe I viſit ſoon will know my Name
Without a *Diary* to explain the ſame.

An

Ænigmatical ANAGRAM, by Mr *S. Hammond*, of *Nottingham*.

Some talk of *Cupid's* Darts and Flame when they Addreſſes make,
But fair *Clarinda's Maiden-name* makes greateſt Heroes *quake*;
For if a *Point* ſo *ſharp* diſclos'd as almoſt *pierc'd* me thro';
And when the *Letters* were *tranſpos'd* I did a *Prickle* view:
Yet but *five* Letters it contains, of which *four* Conſonants are;
I've ſaid enough; it now remains that you her *Name* declare.

A PARADOX, by Mr. *John Dyke*.

Twelve Trees (of diff'rent Kinds of Fruit)
I in *Six* Rows would plant,
In each Row *Four*; —— but how to do't
I your *Aſſiſtance* want.

REBUS, by Mr. *John Noorthouck*.

Take Half a foreign *Soldier's* Name,
With what a *Parſon* wears;
It makes what *Miſs* wou'd fain poſſeſs,
When paſt a Dozen Years.

An *Alphabetical Catalogue* of Contributors to this *Diary*.

The Letters i, ii, &c. ſhew the Queſt. the Figures the Ænig. each anſw'd.

MR. Tho. Arundel 2. Mr Wm Bevil ii, iv, vii. prop. i. Mr Wm Bacon viii, ix, x. Mr Rob. Butler i, ii, iv, v, vi, vii. Mr Sam. Bamfield all Q. 1, 2, 4, 5. T. C. Writing Maſt. iv, v, vii, x. Ecl. Mr J. Coates. Mr John Cheſter 2, 4, 5. Mr Wm Cottam i, ii, iii, vi, vii, viii, x. Prop. i Q. 2 Æn. and 2 Paradoxes. Jack Careleſs ii, iv, v, ix, x. 1, 2, 5. Mr Ed. Croſs ii, iii, iv, ix. Mr Ben. Donn all Q. 1, 5. prop. i Q. Mr John Dyke 2, 4, 5. prop. 1 Æ. D. Davis Writing Maſt. &c. prop. 2 Æ. Mr Lhewelin Davis iii, vii, ix, x. Mr Wm Enefer i, ii, iv, v, ix, x. 1, 2, 4, 5. Mr Geo. Godhelp iii, iv, v. prop. i Q. Mr Zac. Gaſkill v, viii, ix. Mr Ric. Gibbons ii, iv, viii, ix, x. prop. 2 Æ. Mr Tho. Garrard all Q. Mr John Hudſon ix, x. Mr Steph. Hartley i, iv, viii, x. 1, 2, 4, 5, 6. Mr Wm H. iv, x. Mr Sam. Hodgkin 2, prop i Q. Mr J. Hollingworth. Mr Wm Heaſord 2, 4, 5. prop. 1 Æ. Mr John Holden all Q. prop. 1 Æ. Mr Cha. Jacka 1, 2, 5. Mr Wm Kingſtone all Q. 1, 2, 4, 5. Mr Tho. Love 1, 2, 3, 5. Mr Cha. Maſon Jun. prop. i Q. Mr Rich. Mallock iv, viii, ix, x. Mr Tho. Moſs all Q. but 2. prop. in new Q. Mr John Nichols iii, iv, v, vii, viii, ix. Mr John Noorthouck 1, 2, 5, 6. prop. 1 Æ. 1 Reb. Mr Abr. Pethebridge. Mr Tho. Pooke x. 1, 2, 5. Mr Rob. Pearſon 2. Mr Joſ. Piel Writing Maſter &c. Mr Wm Richardſon Schoolmaſter in Durham prop. 1 Æ. Mr Alex. Rowe x. 2, 3, 5. prop. ii new Q. Mr Edw. Rogers ii, ix, x. Mr Joſ. Scott iv, ix, x. Mr Paul Sharp ii, iv. 1, 2, 5. Mr Wm Swift 4, 5, 6. Mr Wm Smith ix, x. 1, 2, 3. Mr Wm Spicer ii, iii, iv, x. Tabularius i, ii, iii, iv, v, vi. Tryphena 1, 2, 5. Mr John Thompſon iii, iv, ix. Mr John Watchorne i, ii. iv, v, vii, viii, ix, x. Mr John Wiggleſworth ii, iv, v, vii, ix, x. Mr Harland Widd i, iv, vii, viii, x. and Ecls. Mr And. Wheldon prop. i Q. and 1 Æ. Mr Matth. Ward ix, x. prop. i Q. Mr John Woolley ii, iii, ix, x. 2, 3, 4, 5, 6. Mr Tho. Walker iii, ix.

FINIS.